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Text Part Number: 78EE117C99-1348750438

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# 1.3 packaging 21.3

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## 1.4 elfutils 0.186-1.el8

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## 1.5 lvm2 1.02.181-3.el8

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## 1.6 libdevmapper 1.02.181

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```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

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```
Gnomovision version 69, Copyright (C) year name of author
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This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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## 1.7 glibc 2.28

### 1.7.1 Available under license :

```
/* _setjmp is implemented in setjmp.S */
@c The GNU Lesser General Public License.
@center Version 2.1, February 1999
```

```
@c This file is intended to be included within another document,
@c hence no sectioning command or @node.
```

```
@display
Copyright @copyright{ } 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA
```

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/\* setjmp is implemented in setjmp.S \*/

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# 1.9 iconv 2.28

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## 1.10 pyjwt 2.4.0

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## 1.11 python-setuptools 39.2.0 6.e18

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Julian Seward, jseward@bzip.org  
bzip2/libbzip2 version 1.0.6 of 6 September 2010

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Version 3.1, 31 March 2009

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=====

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SIGNATURE OF TY COON, 1 April 1990  
Ty Coon, President of Vice

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@var{signature of Ty Coon}, 1 April 1990

Ty Coon, President of Vice

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That's all there is to it!

## 1.13 python-certifi 2022.6.15

### 1.13.1 Available under license :

This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication.

Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

# 1.14 python-requests 2.18.4

## 1.14.1 Available under license :

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# 1.16 python-requests 2.27.1

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## 1.17 open-ldap 2.4.46-18.el8

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\* /opt/cola/permits/1236666229\_1638573382.89/0/lua-5.3.4-12.el8.src.rpm-cosi-expand-archive-A0EuhZkO/mit.txt

## 1.24 keyutils 1.5.10-9.el8

### 1.24.1 Available under license :

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```
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```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
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## 1.27 bzip2 1.0.6 26.el8

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Julian Seward, jseward@bzip.org  
bzip2/libbzip2 version 1.0.6 of 6 September 2010

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## 1.28 shadow-utils 4.6-16.el8

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Metadata-Version: 1.0

Name: simplepam

Version: 0.1.5

Summary: An interface to the Pluggable Authentication Modules (PAM) library on linux, written in pure python (using ctypes)

Home-page: <https://github.com/leonnnn/python3-simplepam>

Author: Leon Weber <leon@leonweber.de>, Chris AtLee <chris@atlee.ca>

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Found in path(s):

\* /opt/cola/permits/1348753420\_1662001183.6647942/0/simplepam-0-1-5-tar-gz/simplepam-0.1.5/PKG-INFO

# 1.30 aiohttp 3.7.4

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## 1.33 libksba 1.3.5 7.el8

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## 1.34 python-requests 2.28.1

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## 1.37 libcroco 0.6.12 4.el8\_2.1

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

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## 1.38 html5lib 1.0b10

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## 1.39 apscheduler 3.6.3

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## 1.40 popt 1.18-1.e18

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## 1.41 python-socketio 4.6.1

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## 1.42 webencodings 0.5.1

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Found in path(s):

```
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/labels.py
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/__init__.py
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/tests.py
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/x_user_defined.py
```

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```
from setuptools import setup, find_packages
import io
from os import path
import re
```

```
VERSION = re.search("VERSION = '([^\s]+)'", io.open(
```

```

    path.join(path.dirname(__file__), 'webencodings', '__init__.py'),
    encoding='utf-8'
).read().strip()).group(1)

LONG_DESCRIPTION = io.open(
    path.join(path.dirname(__file__), 'README.rst'),
    encoding='utf-8'
).read()

setup(
    name='webencodings',
    version=VERSION,
    url='https://github.com/SimonSapin/python-webencodings',
    license='BSD',
    author='Simon Sapin',
    author_email='simon.sapin@exyr.org',
    maintainer='Geoffrey Sneddon',
    maintainer_email='me@gsnedders.com',
    description='Character encoding aliases for legacy web content',
    long_description=LONG_DESCRIPTION,
    classifiers=[
        'Development Status :: 4 - Beta',
        'Intended Audience :: Developers',
        'License :: OSI Approved :: BSD License',
        'Programming Language :: Python',
        'Programming Language :: Python :: 2',
        'Programming Language :: Python :: 2.6',
        'Programming Language :: Python :: 2.7',
        'Programming Language :: Python :: 3',
        'Programming Language :: Python :: 3.3',
        'Programming Language :: Python :: 3.4',
        'Programming Language :: Python :: 3.5',
        'Programming Language :: Python :: 3.6',
        'Programming Language :: Python :: Implementation :: CPython',
        'Programming Language :: Python :: Implementation :: PyPy',
        'Topic :: Internet :: WWW/HTTP',
    ],
    packages=find_packages(),
)

```

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/setup.py

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Metadata-Version: 1.1

Name: webencodings

Version: 0.5.1

Summary: Character encoding aliases for legacy web content

Home-page: <https://github.com/SimonSapin/python-webencodings>

Author: Geoffrey Sneddon

Author-email: [me@gsnedders.com](mailto:me@gsnedders.com)

License: BSD

Description: python-webencodings

=====

This is a Python implementation of the `WHATWG Encoding standard` [<http://encoding.spec.whatwg.org/>](http://encoding.spec.whatwg.org/)` \_.

\* Latest documentation: <http://packages.python.org/webencodings/>

\* Source code and issue tracker:

<https://github.com/gsnedders/python-webencodings>

\* PyPI releases: <http://pypi.python.org/pypi/webencodings>

\* License: BSD

\* Python 2.6+ and 3.3+

In order to be compatible with legacy web content

when interpreting something like ``Content-Type: text/html; charset=latin1``, tools need to use a particular set of aliases for encoding labels as well as some overriding rules.

For example, ``US-ASCII`` and ``iso-8859-1`` on the web are actually aliases for ``windows-1252``, and an UTF-8 or UTF-16 BOM takes precedence over any other encoding declaration.

The Encoding standard defines all such details so that implementations do not have to reverse-engineer each other.

This module has encoding labels and BOM detection, but the actual implementation for encoders and decoders is Python's.

Platform: UNKNOWN

Classifier: Development Status :: 4 - Beta

Classifier: Intended Audience :: Developers

Classifier: License :: OSI Approved :: BSD License

Classifier: Programming Language :: Python

Classifier: Programming Language :: Python :: 2

Classifier: Programming Language :: Python :: 2.6

Classifier: Programming Language :: Python :: 2.7

Classifier: Programming Language :: Python :: 3

Classifier: Programming Language :: Python :: 3.3

Classifier: Programming Language :: Python :: 3.4

Classifier: Programming Language :: Python :: 3.5

Classifier: Programming Language :: Python :: 3.6

Classifier: Programming Language :: Python :: Implementation :: CPython

Classifier: Programming Language :: Python :: Implementation :: PyPy

Classifier: Topic :: Internet :: WWW/HTTP

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings.egg-info/PKG-INFO

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/PKG-INFO

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"""

webencodings.mklables

~~~~~

Regenerate the webencodings.labels module.

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"""

import json

try:

    from urllib import urlopen

except ImportError:

    from urllib.request import urlopen

def assert\_lower(string):

    assert string == string.lower()

    return string

def generate(url):

    parts = ["\

"""

webencodings.labels

~~~~~

Map encoding labels to their name.

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"""

# XXX Do not edit!

# This file is automatically generated by mklables.py

```

LABELS = {
    ""
    labels = [
        (repr(assert_lower(label)).rstrip('u'),
         repr(encoding['name']).rstrip('u'))
        for category in json.loads(urlopen(url).read().decode('ascii'))
        for encoding in category['encodings']
        for label in encoding['labels']]
    max_len = max(len(label) for label, name in labels)
    parts.extend(
        ' %s:%s %s,\n' % (label, ' ' * (max_len - len(label)), name)
        for label, name in labels)
    parts.append('}')
    return ".join(parts)

if __name__ == '__main__':
    print(generate('http://encoding.spec.whatwg.org/encodings.json'))

```

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/mklabels.py

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python-webencodings

=====

This is a Python implementation of the `WHATWG Encoding standard`  
[<http://encoding.spec.whatwg.org/>](http://encoding.spec.whatwg.org/)`\_.

- \* Latest documentation: <http://packages.python.org/webencodings/>
- \* Source code and issue tracker:  
<https://github.com/gsnedders/python-webencodings>
- \* PyPI releases: <http://pypi.python.org/pypi/webencodings>
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- \* Python 2.6+ and 3.3+

In order to be compatible with legacy web content

when interpreting something like ``Content-Type: text/html; charset=latin1``,  
tools need to use a particular set of aliases for encoding labels  
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For example, ``US-ASCII`` and ``iso-8859-1`` on the web are actually  
aliases for ``windows-1252``, and an UTF-8 or UTF-16 BOM takes precedence  
over any other encoding declaration.

The Encoding standard defines all such details so that implementations do  
not have to reverse-engineer each other.

This module has encoding labels and BOM detection,  
but the actual implementation for encoders and decoders is Python's.

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\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/README.rst

## 1.43 audit 3.0.7-2.el8.2

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is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work

under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is

normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or

table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or

derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse

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You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

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which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

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That's all there is to it!

HAPROXY's license - 2006/06/15

Historically, haproxy has been covered by GPL version 2. However, an issue appeared in GPL which will prevent external non-GPL code from being built using the headers provided with haproxy. My long-term goal is to build a core system able to load external modules to support specific application protocols.

Since some protocols are found in rare environments (finance, industry, ...), some of them might be accessible only after signing an NDA. Enforcing GPL on such modules would only prevent them from ever being implemented, while not providing anything useful to ordinary users.

For this reason, I *\*want\** to be able to support binary only external modules

when needed, with a GPL core and GPL modules for standard protocols, so that people fixing bugs don't keep them secretly to try to stay over competition.

The solution was then to apply the LGPL license to the exportable include files, while keeping the GPL for all the rest. This way, it still is mandatory to redistribute modified code under customer request, but at the same time, it is expressly permitted to write, compile, link and load non-GPL code using the LGPL header files and not to distribute them if it causes a legal problem.

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Willy Tarreau - w@lwt.eu

## 1.48 cpio 2.12-11.el8

### 1.48.1 Available under license :

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Version 3, 29 June 2007

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### 1. Source Code.

The "source code" for a work means the preferred form of the work

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## 1.53 sed 4.5-5.el8

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```
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```
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```

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<signature of Ty Coon>, 1 April 1989  
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#####

```
## Constant-time SSSE3 AES core implementation.
## version 0.1
##
## By Mike Hamburg (Stanford University), 2009
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##
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## 1.58 sqlite 3.39.2

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## 1.59 which 2.21-17.el8

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We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

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Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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## 1.63 libcap-ng 0.7.11-1.el8

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6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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```
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```

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```
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```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
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## 1.64 crypto-policies 20211116- 1.gitae470d6.el8

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* Rob Earhart
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* Rob Siemborski
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```

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## 1.69 charset-normalizer 2.0.12

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## Commands to generate dependency files
GEN_DEPS.c= $(CC) -E -MM $(DEFS) $(CPPFLAGS)
GEN_DEPS.cc= $(CXX) -E -MM $(DEFS) $(CPPFLAGS)

## Flags for position independent code
SHAREDLIBCFLAGS = -fPIC
SHAREDLIBCXXFLAGS = -fPIC
SHAREDLIBCPPFLAGS = -DPIC

## Additional flags when building libraries and with threads
THREADSCPPFLAGS = -D_REENTRANT
LIBCPPFLAGS =

## Compiler switch to embed a runtime search path
LD_RPATH=
LD_RPATH_PRE= -Wl,-rpath,

## Compiler switch to embed a library name
LD_SONAME = -Wl,-soname -Wl,$(notdir $(MIDDLE_SO_TARGET))

## Shared library options
LD_SOOPTIONS= -Wl,-Bsymbolic

## Shared object suffix
SO = so

## Non-shared intermediate object suffix
STATIC_O = ao

## Compilation rules
%.${STATIC_O}: $(srcdir)/%.c
$(COMPILE.c) $(STATICCPPFLAGS) $(STATICCFLAGS) -o $@ $<
%.o: $(srcdir)/%.c
$(COMPILE.c) $(DYNAMICCPPFLAGS) $(DYNAMICCFLAGS) -o $@ $<

%.${STATIC_O}: $(srcdir)/%.cpp
$(COMPILE.cc) $(STATICCPPFLAGS) $(STATICCXXFLAGS) -o $@ $<
%.o: $(srcdir)/%.cpp
```

```
$(COMPILE.cc) $(DYNAMICCPPFLAGS) $(DYNAMICCXXFLAGS) -o $$@ $<
```

```
## Dependency rules
```

```
%.d: $(srcdir)/%.c
```

```
@echo "generating dependency information for $<"
```

```
@$(SHELL) -ec '$(GEN_DEPS.c) $< \
```

```
| sed "s^\($*\)\.o[ :]*^1.o $$@ : /g" > $$@; \
```

```
[ -s $$@ ] || rm -f $$@'
```

```
%.d: $(srcdir)/%.cpp
```

```
@echo "generating dependency information for $<"
```

```
@$(SHELL) -ec '$(GEN_DEPS.cc) $< \
```

```
| sed "s^\($*\)\.o[ :]*^1.o $$@ : /g" > $$@; \
```

```
[ -s $$@ ] || rm -f $$@'
```

```
## Versioned libraries rules
```

```
%.${SO}.${SO_TARGET_VERSION_MAJOR}: %.${SO}.${SO_TARGET_VERSION}
```

```
$(RM) $$@ && ln -s ${<F} $$@
```

```
%.${SO}: %.${SO}.${SO_TARGET_VERSION_MAJOR}
```

```
$(RM) $$@ && ln -s ${*F}.${SO}.${SO_TARGET_VERSION} $$@
```

```
## Bind internal references
```

```
# LDFlags that pkgdata will use
```

```
BIR_LDFLAGS= -Wl,-Bsymbolic
```

```
# Dependencies [i.e. map files] for the final library
```

```
BIR_DEPS=
```

```
## Remove shared library 's'
```

```
STATIC_PREFIX_WHEN_USED =
```

```
STATIC_PREFIX =
```

```
## End BSD-specific setup
```

```
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```

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## 1.75 python 3.9.13

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner | GPL-compatible? (1) |
|----------------|--------------|-----------|-------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI   | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI  | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI  | no                  |

|               |           |          |            |         |
|---------------|-----------|----------|------------|---------|
| 2.0           | 1.6       | 2000     | BeOpen.com | no      |
| 1.6.1         | 1.6       | 2001     | CNRI       | yes (2) |
| 2.1           | 2.0+1.6.1 | 2001     | PSF        | no      |
| 2.0.1         | 2.0+1.6.1 | 2001     | PSF        | yes     |
| 2.1.1         | 2.1+2.0.1 | 2001     | PSF        | yes     |
| 2.1.2         | 2.1.1     | 2002     | PSF        | yes     |
| 2.1.3         | 2.1.2     | 2002     | PSF        | yes     |
| 2.2 and above | 2.1.1     | 2001-now | PSF        | yes     |

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## 1.77 iputils 20180629

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```
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Copyright (C) <year> <name of author>
```

```
This program is free software; you can redistribute it and/or modify  
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the Free Software Foundation; either version 2 of the License, or  
(at your option) any later version.
```

```
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GNU General Public License for more details.
```

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51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA.
```

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```
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```

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<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice

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ping: BSD-3

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## 1.78 gpgme 1.13.1-11.el8

### 1.78.1 Available under license :

```
hkp4py
requests
\input texinfo @c -*- texinfo -*-
@c %**start of header
@setfilename what-was-new.info
@settitle What Was New in the GPGME Python Bindings and Documentation
@documentencoding utf-8
@documentlanguage en
@c %**end of header

@finalout
@titlepage
@title What Was New in the GPGME Python Bindings and Documentation
@author Ben McGinnes
@end titlepage

@contents

@ifnottex
@node Top
@top What Was New in the GPGME Python Bindings and Documentation
@end ifnottex

@menu
* What Was New::

@detailmenu
--- The Detailed Node Listing ---

What Was New

* What Was New in GPGME 1120::
```

What Was New in GPGME 1120

\* New in GPGME 1120::

@end detailmenu

@end menu

@node What Was New

@chapter What Was New

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.0.1

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English

@item xml:lang:

@tab en-AU, en-GB, en

@end multitable

The following are all the past @emph{What's New} sections for the Python Bindings HOWTO and other documentation.

@menu

\* What Was New in GPGME 1120::

@end menu

@node What Was New in GPGME 1120

@section What Was New in GPGME 1120

The most obviously new point for those reading this guide is this section on other new things, but that's hardly important. Not given all the other things which spurred the need for adding this section and its subsections.

@menu

\* New in GPGME 1120::

@end menu

@node New in GPGME 1120

@subsection New in GPGME 1120

There have been quite a number of additions to GPGME and the Python

bindings to it since the last release of GPGME with versions 1.11.0 and 1.11.1 in April, 2018.

The bullet points of new additions are:

@itemize

@item

an expanded section on @uref{gpgme-python-howto#installation, installing} and @uref{gpgme-python-howto#snafu, troubleshooting} the Python bindings.

@item

The release of Python 3.7.0; which appears to be working just fine with our bindings, in spite of intermittent reports of problems for many other Python projects with that new release.

@item

Python 3.7 has been moved to the head of the specified python versions list in the build process.

@item

In order to fix some other issues, there are certain underlying functions which are more exposed through the @uref{gpgme-python-howto#howto-get-context, gpg.Context()}, but ongoing documentation ought to clarify that or otherwise provide the best means of using the bindings. Some additions to @samp{gpg.core} and the @samp{Context()}, however, were intended (see below).

@item

Continuing work in identifying and confirming the cause of oft-reported @uref{gpgme-python-howto#snafu-runtime-not-funtime, problems installing the Python bindings on Windows}.

@item

GSOC: Google's Surreptitiously Ordered Conscriptio@dots{ } erm @dots{ } oh, right; Google's Summer of Code. Though there were two hopeful candidates this year; only one ended up involved with the GnuPG Project directly, the other concentrated on an unrelated third party project with closer ties to one of the GNU/Linux distributions than to the GnuPG Project. Thus the Python bindings benefited from GSOC participant Jacob Adams, who added the key@math{\_import} function; building on prior work by Tobias Mueller.

@item

Several new methods functions were added to the gpg.Context(), including: @uref{gpgme-python-howto#howto-import-key, key@math{\_import}}, @uref{gpgme-python-howto#howto-export-key, key@math{\_export}}, @uref{gpgme-python-howto#howto-export-public-key, key@math{\_export}@math{\_minimal}} and @uref{gpgme-python-howto#howto-export-secret-key, key@math{\_export}@math{\_secret}}.

@item

Importing and exporting examples include versions integrated with Marcel Fest's recently released @uref{https://github.com/Selfnet/hkp4py, HKP for Python} module. Some @uref{gpgme-python-howto#hkp4py, additional notes on this module} are included at the end of the HOWTO.

@item

Instructions for dealing with semi-walled garden implementations

like ProtonMail are also included. This is intended to make things a little easier when communicating with users of ProtonMail's services and should not be construed as an endorsement of said service. The GnuPG Project neither favours, nor disfavors ProtonMail and the majority of this deals with interacting with the ProtonMail keyserver.

@item

Semi-formalised the location where [@uref{gpgme-python-howto#draft-editions, draft versions}](#) of this HOWTO may periodically be accessible. This is both for the reference of others and testing the publishing of the document itself. Renamed this file at around the same time.

@item

The Texinfo documentation build configuration has been replicated from the parent project in order to make to maintain consistency with that project (and actually ship with each release).

@item

a reStructuredText (`@samp{.rst}`) version is also generated for Python developers more used to and comfortable with that format as it is the standard Python documentation format and Python developers may wish to use it with Sphinx. Please note that there has been no testing of the reStructuredText version with Sphinx at all. The reST file was generated by the simple expedient of using [@uref{https://pandoc.org/}](https://pandoc.org/), Pandoc.

@item

Added a new section for [@uref{gpgme-python-howto#advanced-use, advanced or experimental use}](#).

@item

Began the advanced use cases with [@uref{gpgme-python-howto#cython, a section}](#) on using the module with [@uref{https://cython.org/}](https://cython.org/), Cython.

@item

Added a number of new scripts to the `@samp{example/howto/}` directory; some of which may be in advance of their planned sections of the HOWTO (and some are just there because it seemed like a good idea at the time).

@item

Cleaned up a lot of things under the hood.

@end itemize

@bye

This is gpgme.info, produced by makeinfo version 6.3 from gpgme.texi.

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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File: gpgme.info, Node: Top, Next: Introduction, Up: (dir)

Main Menu

\*\*\*\*\*

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100 of the GPGME library.

\* Menu:

- \* Introduction:: How to use this manual.
- \* Preparation:: What you should do before using the library.
- \* Protocols and Engines:: Supported crypto protocols.
- \* Algorithms:: Supported algorithms.
- \* Error Handling:: Error numbers and their meanings.
- \* Exchanging Data:: Passing data to and from GPGME.
- \* Contexts:: Handling GPGME contexts.

Appendices

- \* UI Server Protocol::       The GnuPG UI Server Protocol.
- \* Debugging::               How to solve problems.
- \* Deprecated Functions::     Documentation of deprecated functions.
  
- \* Library Copying::         The GNU Lesser General Public License says  
                                  how you can copy and share GnuPG Made Easy.
- \* Copying::                 The GNU General Public License says how you  
                                  can copy and share this manual.

## Indices

- \* Concept Index::            Index of concepts and programs.
- \* Function and Data Index::   Index of functions, variables and data types.

## The Detailed Node Listing

## Introduction

- \* Getting Started::         Purpose of the manual, and how to use it.
- \* Features::                Reasons to install and use GPGME.
- \* Overview::                Basic architecture of the GPGME library.

## Preparation

- \* Header::                 What header file you need to include.
- \* Building the Source::     Compiler options to be used.
- \* Largefile Support (LFS)::   How to use GPGME with LFS.
- \* Using Automake::         Compiler options to be used the easy way.
- \* Using Libtool::         Avoiding compiler options entirely.
- \* Library Version Check::   Getting and verifying the library version.
- \* Signal Handling::         How GPGME affects signal handling.
- \* Multi-Threading::        How GPGME can be used in an MT environment.

## Protocols and Engines

- \* Engine Version Check::    Verifying the engine version.
- \* Engine Information::     Obtaining more information about the engines.
- \* Engine Configuration::    Changing the engine configuration.
- \* OpenPGP::                Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.

## Algorithms

- \* Public Key Algorithms::    A list of all public key algorithms.
- \* Hash Algorithms::         A list of all hash algorithms.

## Error Handling

- \* Error Values:: The error value and what it means.
- \* Error Codes:: A list of important error codes.
- \* Error Sources:: A list of important error sources.
- \* Error Strings:: How to get a descriptive string from a value.

## Exchanging Data

- \* Creating Data Buffers:: Creating new data buffers.
- \* Destroying Data Buffers:: Releasing data buffers.
- \* Manipulating Data Buffers:: Operations on data buffers.

## Creating Data Buffers

- \* Memory Based Data Buffers:: Creating memory based data buffers.
- \* File Based Data Buffers:: Creating file based data buffers.
- \* Callback Based Data Buffers:: Creating callback based data buffers.

## Manipulating Data Buffers

- \* Data Buffer I/O Operations:: I/O operations on data buffers.
- \* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
- \* Data Buffer Convenience:: Convenience function for data buffers.

## Contexts

- \* Creating Contexts:: Creating new GPGME contexts.
- \* Destroying Contexts:: Releasing GPGME contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with GPGME.
- \* Trust Item Management:: Managing trust items with GPGME.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations.
- \* Run Control:: Controlling how operations are run.

## Context Attributes

- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting ASCII armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
- \* Progress Meter Callback:: Being informed about the progress.

- \* Status Message Callback:: Status messages received from gpg.
- \* Locale:: Setting the locale of a context.

## Key Management

- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.
- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
- \* Advanced Key Editing:: Advanced key edit operation.

## Trust Item Management

- \* Listing Trust Items:: Browsing the list of available trust items.
- \* Manipulating Trust Items:: Operations on trust items.

## Crypto Operations

- \* Decrypt:: Decrypting a ciphertext.
- \* Verify:: Verifying a signature.
- \* Decrypt and Verify:: Decrypting a signed ciphertext.
- \* Sign:: Creating a signature.
- \* Encrypt:: Encrypting a plaintext.

## Sign

- \* Selecting Signers:: How to choose the keys to sign with.
- \* Creating a Signature:: How to create a signature.
- \* Signature Notation Data:: How to add notation data to a signature.

## Encrypt

- \* Encrypting a Plaintext:: How to encrypt a plaintext.

## Miscellaneous

- \* Running other Programs:: Running other Programs.
- \* Using the Assuan protocol:: Using the Assuan protocol.
- \* Checking for updates:: How to check for software updates.

## Run Control

- \* **Waiting For Completion::**     Waiting until an operation is completed.
- \* **Using External Event Loops::**   Advanced control over what happens when.
- \* **Cancellation::**                How to end pending operations prematurely.

### Using External Event Loops

- \* **I/O Callback Interface::**     How I/O callbacks are registered.
- \* **Registering I/O Callbacks::**   How to use I/O callbacks for a context.
- \* **I/O Callback Example::**        An example how to use I/O callbacks.
- \* **I/O Callback Example GTK+::**   How to integrate GPGME in GTK+.
- \* **I/O Callback Example GDK::**    How to integrate GPGME in GDK.
- \* **I/O Callback Example Qt::**     How to integrate GPGME in Qt.

File: gpgme.info, Node: Introduction, Next: Preparation, Prev: Top, Up: Top

## 1 Introduction

\*\*\*\*\*

GnuPG Made Easy (GPGME) is a C language library that allows to add support for cryptography to a program. It is designed to make access to public key crypto engines like GnuPG or GpgSM easier for applications. GPGME provides a high-level crypto API for encryption, decryption, signing, signature verification and key management.

GPGME uses GnuPG and GpgSM as its backends to support OpenPGP and the Cryptographic Message Syntax (CMS).

\* **Menu:**

- \* **Getting Started::**            Purpose of the manual, and how to use it.
- \* **Features::**                 Reasons to install and use GPGME.
- \* **Overview::**                 Basic architecture of the GPGME library.

File: gpgme.info, Node: Getting Started, Next: Features, Up: Introduction

### 1.1 Getting Started

=====

This manual documents the GPGME library programming interface. All functions and data types provided by the library are explained.

The reader is assumed to possess basic knowledge about cryptography in general, and public key cryptography in particular. The underlying cryptographic engines that are used by the library are not explained,

but where necessary, special features or requirements by an engine are mentioned as far as they are relevant to GPGME or its users.

This manual can be used in several ways. If read from the beginning to the end, it gives a good introduction into the library and how it can be used in an application. Forward references are included where necessary. Later on, the manual can be used as a reference manual to get just the information needed about any particular interface of the library. Experienced programmers might want to start looking at the examples at the end of the manual, and then only read up those parts of the interface which are unclear.

The documentation for the language bindings is currently not included in this manual. Those languages bindings follow the general programming model of GPGME but may provide some extra high level abstraction on top of the GPGME style API. For now please see the README files in the lang/ directory of the source distribution.

File: gpgme.info, Node: Features, Next: Overview, Prev: Getting Started, Up: Introduction

## 1.2 Features

=====

GPGME has a couple of advantages over other libraries doing a similar job, and over implementing support for GnuPG or other crypto engines into your application directly.

its free software

Anybody can use, modify, and redistribute it under the terms of the GNU Lesser General Public License (\*note Library Copying:).

its flexible

GPGME provides transparent support for several cryptographic protocols by different engines. Currently, GPGME supports the OpenPGP protocol using GnuPG as the backend, and the Cryptographic Message Syntax using GpgSM as the backend.

its easy

GPGME hides the differences between the protocols and engines from the programmer behind an easy-to-use interface. This way the programmer can focus on the other parts of the program, and still integrate strong cryptography in his application. Once support for GPGME has been added to a program, it is easy to add support for other crypto protocols once GPGME backends provide them.

its language friendly

GPGME comes with languages bindings for several common programming

languages: Common Lisp, C++, Python 2, and Python 3.

File: [gpgme.info](#), Node: [Overview](#), [Prev: Features](#), [Up: Introduction](#)

### 1.3 Overview

=====

GPGME provides a data abstraction that is used to pass data to the crypto engine, and receive returned data from it. Data can be read from memory or from files, but it can also be provided by a callback function.

The actual cryptographic operations are always set within a context. A context provides configuration parameters that define the behaviour of all operations performed within it. Only one operation per context is allowed at any time, but when one operation is finished, you can run the next operation in the same context. There can be more than one context, and all can run different operations at the same time.

Furthermore, GPGME has rich key management facilities including listing keys, querying their attributes, generating, importing, exporting and deleting keys, and acquiring information about the trust path.

With some precautions, GPGME can be used in a multi-threaded environment, although it is not completely thread safe and thus needs the support of the application.

File: [gpgme.info](#), Node: [Preparation](#), [Next: Protocols and Engines](#), [Prev: Introduction](#), [Up: Top](#)

## 2 Preparation

\*\*\*\*\*

To use GPGME, you have to perform some changes to your sources and the build system. The necessary changes are small and explained in the following sections. At the end of this chapter, it is described how the library is initialized, and how the requirements of the library are verified.

\* Menu:

- \* Header::                   What header file you need to include.
- \* Building the Source::     Compiler options to be used.
- \* Largefile Support (LFS)::   How to use GPGME with LFS.
- \* Using Automake::           Compiler options to be used the easy way.
- \* Using Libtool::            Avoiding compiler options entirely.

- \* Library Version Check::      Getting and verifying the library version.
- \* Signal Handling::            How GPGME affects signal handling.
- \* Multi-Threading::          How GPGME can be used in an MT environment.

File: gpgme.info, Node: Header, Next: Building the Source, Up: Preparation

## 2.1 Header

=====

All interfaces (data types and functions) of the library are defined in the header file `gpgme.h`. You must include this in all programs using the library, either directly or through some other header file, like this:

```
#include <gpgme.h>
```

The name space of GPGME is `gpgme_*` for function names and data types and `GPGME_*` for other symbols. Symbols internal to GPGME take the form `_gpgme_*` and `_GPGME_*`.

Because GPGME makes use of the GPG Error library, using GPGME will also use the `GPG_ERR_*` name space directly, and the `gpg_err*`, `gpg_str*`, and `gpgmt_*` name space indirectly.

File: gpgme.info, Node: Building the Source, Next: Largefile Support (LFS), Prev: Header, Up: Preparation

## 2.2 Building the Source

=====

If you want to compile a source file including the `gpgme.h` header file, you must make sure that the compiler can find it in the directory hierarchy. This is accomplished by adding the path to the directory in which the header file is located to the compilers include file search path (via the `-I` option).

However, the path to the include file is determined at the time the source is configured. To solve this problem, `gpgme` ships with a small helper program `gpgme-config` that knows about the path to the include file and other configuration options. The options that need to be added to the compiler invocation at compile time are output by the `--cflags` option to `gpgme-config`. The following example shows how it can be used at the command line:

```
gcc -c foo.c `gpgme-config --cflags`
```

Adding the output of `gpgme-config --cflags` to the compiler command

line will ensure that the compiler can find the GPGME header file.

A similar problem occurs when linking the program with the library. Again, the compiler has to find the library files. For this to work, the path to the library files has to be added to the library search path (via the `-L` option). For this, the option `--libs` to `gpgme-config` can be used. For convenience, this option also outputs all other options that are required to link the program with GPGME (in particular, the `-lgpgme` option). The example shows how to link `foo.o` with the GPGME library to a program `foo`.

```
gcc -o foo foo.o `gpgme-config --libs`
```

Of course you can also combine both examples to a single command by specifying both options to `gpgme-config`:

```
gcc -o foo foo.c `gpgme-config --cflags --libs`
```

If you need to detect the installed language bindings you can use `list` them using:

```
gpgme-config --print-lang
```

or test for the availability using

```
gpgme-config --have-lang=python && echo 'Bindings for Pythons available'
```

File: [gpgme.info](#), Node: [Largefile Support \(LFS\)](#), Next: [Using Automake](#), Prev: [Building the Source](#), Up: [Preparation](#)

## 2.3 Largefile Support (LFS)

=====

GPGME is compiled with largefile support by default, if it is available on the system. This means that GPGME supports files larger than two gigabyte in size, if the underlying operating system can. On some systems, largefile support is already the default. On such systems, nothing special is required. However, some systems provide only support for files up to two gigabyte in size by default. Support for larger file sizes has to be specifically enabled.

To make a difficult situation even more complex, such systems provide two different types of largefile support. You can either get all relevant functions replaced with alternatives that are largefile capable, or you can get new functions and data types for largefile support added. Those new functions have the same name as their smallfile counterparts, but with a suffix of `64`.

An example: The data type `off_t` is 32 bit wide on GNU/Linux PC systems. To address offsets in large files, you can either enable largefile support add-on. Then a new data type `off64_t` is provided, which is 64 bit wide. Or you can replace the existing `off_t` data type with its 64 bit wide counterpart. All occurrences of `off_t` are then automagically replaced.

As if matters were not complex enough, there are also two different types of file descriptors in such systems. This is important because if file descriptors are exchanged between programs that use a different maximum file size, certain errors must be produced on some file descriptors to prevent subtle overflow bugs from occurring.

As you can see, supporting two different maximum file sizes at the same time is not at all an easy task. However, the maximum file size does matter for GPGME, because some data types it uses in its interfaces are affected by that. For example, the `off_t` data type is used in the `gpgme_data_seek` function, to match its POSIX counterpart. This affects the call-frame of the function, and thus the ABI of the library. Furthermore, file descriptors can be exchanged between GPGME and the application.

For you as the user of the library, this means that your program must be compiled in the same file size mode as the library. Luckily, there is absolutely no valid reason for new programs to not enable largefile support by default and just use that. The compatibility modes (small file sizes or dual mode) can be considered an historic artefact, only useful to allow for a transitional period.

On POSIX platforms GPGME is compiled using largefile support by default. This means that your application must do the same, at least as far as it is relevant for using the `gpgme.h` header file. All types in this header files refer to their largefile counterparts, if they are different from any default types on the system.

On 32 and 64 bit Windows platforms `off_t` is declared as 32 bit signed integer. There is no specific support for LFS in the C library. The recommendation from Microsoft is to use the native interface (`CreateFile` et al.) for large files. Released binary versions of GPGME (`libgpgme-11.dll`) have always been build with a 32 bit `off_t`. To avoid an ABI break we stick to this convention for 32 bit Windows by using `long` there. GPGME versions for 64 bit Windows have never been released and thus we are able to use `int64_t` instead of `off_t` there. For easier migration the typedef `gpgme_off_t` has been defined. The reason we cannot use `off_t` directly is that some toolchains (e.g. `mingw64`) introduce a POSIX compatible hack for `off_t`. Some widely used toolkits make use of this hack and in turn GPGME would need to use

it also. However, this would introduce an ABI break and existing software making use of libpgpme might suffer from a severe break. Thus with version 1.4.2 we redefined all functions using `off_t` to use `pgpme_off_t` which is defined as explained above. This way we keep the ABI well defined and independent of any toolchain hacks. The bottom line is that LFS support in GPGME is only available on 64 bit versions of Windows.

On POSIX platforms you can enable largefile support, if it is different from the default on the system the application is compiled on, by using the Autoconf macro `AC_SYS_LARGEFILE`. If you do this, then you don't need to worry about anything else: It will just work. In this case you might also want to use `AC_FUNC_FSEEKO` to take advantage of some new interfaces, and `AC_TYPE_OFF_T` (just in case).

If you do not use Autoconf, you can define the preprocessor symbol `_FILE_OFFSET_BITS` to 64 *before* including any header files, for example by specifying the option `-D_FILE_OFFSET_BITS=64` on the compiler command line. You will also want to define the preprocessor symbol `LARGEFILE_SOURCE` to 1 in this case, to take advantage of some new interfaces.

If you do not want to do either of the above, you probably know enough about the issue to invent your own solution. Just keep in mind that the GPGME header file expects that largefile support is enabled, if it is available. In particular, we do not support dual mode (`_LARGEFILE64_SOURCE`).

File: `gpgme.info`, Node: Using Automake, Next: Using Libtool, Prev: Largefile Support (LFS), Up: Preparation

## 2.4 Using Automake

=====

It is much easier if you use GNU Automake instead of writing your own Makefiles. If you do that you do not have to worry about finding and invoking the `gpgme-config` script at all. GPGME provides an extension to Automake that does all the work for you.

```
-- Macro: AM_PATH_GPGME ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])  
-- Macro: AM_PATH_GPGME_PTH ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])  
-- Macro: AM_PATH_GPGME_PTHREAD ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])
```

Check whether GPGME (at least version `MINIMUM-VERSION`, if given) exists on the host system. If it is found, execute `ACTION-IF-FOUND`, otherwise do `ACTION-IF-NOT-FOUND`, if given.

Additionally, the function defines GPGME\_CFLAGS to the flags needed for compilation of the program to find the gpgme.h header file, and GPGME\_LIBS to the linker flags needed to link the program to the GPGME library. If the used helper script does not match the target type you are building for a warning is printed and the string libgcrypt is appended to the variable gpg\_config\_script\_warn.

AM\_PATH\_GPGME\_PTH checks for the version of GPGME that can be used with GNU Pth, and defines GPGME\_PTH\_CFLAGS and GPGME\_PTH\_LIBS.

AM\_PATH\_GPGME\_PTHREAD checks for the version of GPGME that can be used with the native pthread implementation, and defines GPGME\_PTHREAD\_CFLAGS and GPGME\_PTHREAD\_LIBS. Since version 1.8.0 this is no longer required to GPGME\_PTHREAD as GPGME itself is thread safe.

This macro searches for gpgme-config along the PATH. If you are cross-compiling, it is useful to set the environment variable SYSROOT to the top directory of your target. The macro will then first look for the helper program in the bin directory below that top directory. An absolute directory name must be used for SYSROOT. Finally, if the configure command line option --with-gpgme-prefix is used, only its value is used for the top directory below which the helper script is expected.

You can use the defined Autoconf variables like this in your Makefile.am:

```
AM_CPPFLAGS = $(GPGME_CFLAGS)
LDADD = $(GPGME_LIBS)
```

File: gpgme.info, Node: Using Libtool, Next: Library Version Check, Prev: Using Automake, Up: Preparation

## 2.5 Using Libtool

=====

The easiest way is to just use GNU Libtool. If you use libtool, and link to libgpgme.la, libgpgme-pth.la or libgpgme-pthread.la respectively, everything will be done automatically by Libtool.

File: gpgme.info, Node: Library Version Check, Next: Signal Handling, Prev: Using Libtool, Up: Preparation

## 2.6 Library Version Check

=====

-- Function: `const char * gpgme_check_version`  
(`const char *REQUIRED_VERSION`)

The function `gpgme_check_version` has four purposes. It can be used to retrieve the version number of the library. In addition it can verify that the version number is higher than a certain required version number. In either case, the function initializes some sub-systems, and for this reason alone it must be invoked early in your program, before you make use of the other functions in GPGME. The last purpose is to run selftests.

As a side effect for W32 based systems, the socket layer will get initialized.

If `REQUIRED_VERSION` is `NULL`, the function returns a pointer to a statically allocated string containing the version number of the library.

If `REQUIRED_VERSION` is not `NULL`, it should point to a string containing a version number, and the function checks that the version of the library is at least as high as the version number provided. In this case, the function returns a pointer to a statically allocated string containing the version number of the library. If `REQUIRED_VERSION` is not a valid version number, or if the version requirement is not met, the function returns `NULL`.

If you use a version of a library that is backwards compatible with older releases, but contains additional interfaces which your program uses, this function provides a run-time check if the necessary features are provided by the installed version of the library.

If a selftest fails, the function may still succeed. Selftest errors are returned later when invoking `gpgme_new` or `gpgme_data_new`, so that a detailed error code can be returned (historically, `gpgme_check_version` does not return a detailed error code).

-- Function: `int gpgme_set_global_flag (const char *NAME,`  
`const char *VALUE)`

SINCE: 1.4.0

On some systems it is not easy to set environment variables and thus hard to use GPGMEs internal trace facility for debugging. This function has been introduced as an alternative way to enable debugging and for a couple of other rarely used tweaks. It is

important to assure that only one thread accesses GPGME functions between a call to this function and after the return from the call to `gpgme_check_version`.

All currently supported features require that this function is called as early as possible even before `gpgme_check_version`.

The features are identified by the following values for NAME:

#### `debug`

To enable debugging use the string `debug` for NAME and VALUE identical to the value used with the environment variable `GPGME_DEBUG`.

#### `disable-gpgconf`

Using this feature with any VALUE disables the detection of the `gpgconf` program and thus forces GPGME to fallback into the simple OpenPGP only mode. It may be used to force the use of GnuPG-1 on systems which have both GPG versions installed.

Note that in general the use of `gpgme_set_engine_info` is a better way to select a specific engine version.

#### `gpgconf-name`

##### `gpg-name`

Set the name of the `gpgconf` respective `gpg` binary. The defaults are `GNU/GnuPG/gpgconf` and `GNU/GnuPG/gpg`. Under Unix the leading directory part is ignored. Under Windows the leading directory part is used as the default installation directory; the `.exe` suffix is added by GPGME. Use forward slashed even under Windows.

#### `require-gnupg`

Set the minimum version of the required GnuPG engine. If that version is not met, GPGME fails early instead of trying to use the existent version. The given version must be a string with major, minor, and micro number. Example: "2.1.0".

#### `w32-inst-dir`

On Windows GPGME needs to know its installation directory to find its spawn helper. This is in general no problem because a DLL has this information. Some applications however link statically to GPGME and thus GPGME can only figure out the installation directory of this application which may be wrong in certain cases. By supplying an installation directory as value to this flag, GPGME will assume that that directory is the installation directory. This flag has no effect on non-Windows platforms.

This function returns 0 on success. In contrast to other

functions the non-zero return value on failure does not convey any error code. For setting debug the only possible error cause is an out of memory condition; which would exhibit itself later anyway. Thus the return value may be ignored.

After initializing GPGME, you should set the locale information to the locale required for your output terminal. This locale information is needed for example for the curses and Gtk pinentry. Here is an example of a complete initialization:

```
#include <locale.h>
#include <gpgme.h>

void
init_gpgme (void)
{
    /* Initialize the locale environment. */
    setlocale (LC_ALL, "");
    gpgme_check_version (NULL);
    gpgme_set_locale (NULL, LC_CTYPE, setlocale (LC_CTYPE, NULL));
#ifdef LC_MESSAGES
    gpgme_set_locale (NULL, LC_MESSAGES, setlocale (LC_MESSAGES, NULL));
#endif
}
```

Note that you are highly recommended to initialize the locale settings like this. GPGME can not do this for you because it would not be thread safe. The conditional on LC\_MESSAGES is only necessary for portability to W32 systems.

File: gpgme.info, Node: Signal Handling, Next: Multi-Threading, Prev: Library Version Check, Up: Preparation

## 2.7 Signal Handling

=====

The GPGME library communicates with child processes (the crypto engines). If a child process dies unexpectedly, for example due to a bug, or system problem, a SIGPIPE signal will be delivered to the application. The default action is to abort the program. To protect against this, `gpgme_check_version` sets the SIGPIPE signal action to SIG\_IGN, which means that the signal will be ignored.

GPGME will only do that if the signal action for SIGPIPE is SIG\_DEF at the time `gpgme_check_version` is called. If it is something different, GPGME will take no action.

This means that if your application does not install any signal

handler for SIGPIPE, you don't need to take any precautions. If you do install a signal handler for SIGPIPE, you must be prepared to handle any SIGPIPE events that occur due to GPGME writing to a defunct pipe. Furthermore, if your application is multi-threaded, and you install a signal action for SIGPIPE, you must make sure you do this either before `gpgme_check_version` is called or afterwards.

File: `gpgme.info`, Node: Multi-Threading, Prev: Signal Handling, Up: Preparation

## 2.8 Multi-Threading

=====

The GPGME library is mostly thread-safe, and can be used in a multi-threaded environment but there are some requirements for multi-threaded use:

The function `gpgme_check_version` must be called before any other function in the library, because it initializes the thread support subsystem in GPGME. To achieve this in multi-threaded programs, you must synchronize the memory with respect to other threads that also want to use GPGME. For this, it is sufficient to call `gpgme_check_version` before creating the other threads using `GPGME(1)`.

Any `gpgme_data_t` and `gpgme_ctx_t` object must only be accessed by one thread at a time. If multiple threads want to deal with the same object, the caller has to make sure that operations on that object are fully synchronized.

Only one thread at any time is allowed to call `gpgme_wait`. If multiple threads call this function, the caller must make sure that all invocations are fully synchronized. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

The function `gpgme_strerror` is not thread safe. You have to use `gpgme_strerror_r` instead.

----- Footnotes -----

(1) At least this is true for POSIX threads, as `pthread_create` is a function that synchronizes memory with respects to other threads. There are many functions which have this property, a complete list can be found in POSIX, IEEE Std 1003.1-2003, Base Definitions, Issue 6, in the definition of the term Memory Synchronization. For other thread packages other, more relaxed or more strict rules may apply.

### 3 Protocols and Engines

\*\*\*\*\*

GPGME supports several cryptographic protocols, however, it does not implement them. Rather it uses backends (also called engines) which implement the protocol. GPGME uses inter-process communication to pass data back and forth between the application and the backend, but the details of the communication protocol and invocation of the backend is completely hidden by the interface. All complexity is handled by GPGME. Where an exchange of information between the application and the backend is necessary, GPGME provides the necessary callback function hooks and further interfaces.

-- Data type: enum gpgme\_protocol\_t

The gpgme\_protocol\_t type specifies the set of possible protocol values that are supported by GPGME. The following protocols are supported:

GPGME\_PROTOCOL\_OpenPGP

GPGME\_PROTOCOL\_OPENPGP

This specifies the OpenPGP protocol.

GPGME\_PROTOCOL\_CMS

This specifies the Cryptographic Message Syntax.

GPGME\_PROTOCOL\_GPGCONF

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_ASSUAN

SINCE: 1.2.0

This specifies the raw Assuan protocol.

GPGME\_PROTOCOL\_G13

SINCE: 1.3.0

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_UISERVER

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_SPAWN

SINCE: 1.5.0

Special protocol for use with `gpgme_op_spawn`.

#### GPGME\_PROTOCOL\_UNKNOWN

Reserved for future extension. You may use this to indicate that the used protocol is not known to the application.

Currently, GPGME does not accept this value in any operation, though, except for `gpgme_get_protocol_name`.

-- Function: `const char * gpgme_get_protocol_name`  
(`gpgme_protocol_t PROTOCOL`)

The function `gpgme_get_protocol_name` returns a statically allocated string describing the protocol `PROTOCOL`, or `NULL` if the protocol number is not valid.

\* Menu:

- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
- \* Engine Configuration:: Changing the engine configuration.
- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.
- \* Assuan:: Support for the raw Assuan protocol.

File: `gpgme.info`, Node: Engine Version Check, Next: Engine Information, Up: Protocols and Engines

### 3.1 Engine Version Check

=====

-- Function: `const char * gpgme_get_dirinfo` (`const char *WHAT`)  
SINCE: 1.5.0

The function `gpgme_get_dirinfo` returns a statically allocated string with the value associated to `WHAT`. The returned values are the defaults and wont change even after `gpgme_set_engine_info` has been used to configure a different engine. `NULL` is returned if no value is available. Commonly supported values for `WHAT` are:

`homedir`

Return the default home directory.

`sysconfdir`

Return the name of the system configuration directory

`bindir`

Return the name of the directory with GnuPG program files.

libdir

Return the name of the directory with GnuPG related library files.

libexecdir

Return the name of the directory with GnuPG helper program files.

datadir

Return the name of the directory with GnuPG shared data.

localedir

Return the name of the directory with GnuPG locale data.

agent-socket

Return the name of the socket to connect to the gpg-agent.

agent-ssh-socket

Return the name of the socket to connect to the ssh-agent component of gpg-agent.

dirmngr-socket

Return the name of the socket to connect to the dirmngr.

uiserver-socket

Return the name of the socket to connect to the user interface server.

gpgconf-name

Return the file name of the engine configuration tool.

gpg-name

Return the file name of the OpenPGP engine.

gpgsm-name

Return the file name of the CMS engine.

g13-name

Return the name of the file container encryption engine.

gpg-wks-client-name

Return the name of the Web Key Service tool.

-- Function: `gpgme_error_t gpgme_engine_check_version`  
(`gpgme_protocol_t PROTOCOL`)

The function `gpgme_engine_check_version` verifies that the engine implementing the protocol `PROTOCOL` is installed in the expected path and meets the version requirement of GPGME.

This function returns the error code `GPG_ERR_NO_ERROR` if the engine is available and `GPG_ERR_INV_ENGINE` if it is not.

File: `gpgme.info`, Node: Engine Information, Next: Engine Configuration, Prev: Engine Version Check, Up: Protocols and Engines

### 3.2 Engine Information

=====

-- Data type: `gpgme_engine_info_t`

The `gpgme_engine_info_t` type specifies a pointer to a structure describing a crypto engine. The structure contains the following elements:

`gpgme_engine_info_t next`

This is a pointer to the next engine info structure in the linked list, or `NULL` if this is the last element.

`gpgme_protocol_t protocol`

This is the protocol for which the crypto engine is used. You can convert this to a string with `gpgme_get_protocol_name` for printing.

`const char *file_name`

This is a string holding the file name of the executable of the crypto engine. Currently, it is never `NULL`, but using `NULL` is reserved for future use, so always check before you use it.

`const char *home_dir`

This is a string holding the directory name of the crypto engines configuration directory. If it is `NULL`, then the default directory is used. See `gpgme_get_dirinfo` on how to get the default directory.

`const char *version`

This is a string containing the version number of the crypto engine. It might be `NULL` if the version number can not be determined, for example because the executable doesn't exist or is invalid.

`const char *req_version`

This is a string containing the minimum required version number of the crypto engine for GPGME to work correctly. This is the version number that `gpgme_engine_check_version` verifies against. Currently, it is never `NULL`, but using

NULL is reserved for future use, so always check before you use it.

-- Function: `gpgme_error_t gpgme_get_engine_info`  
(`gpgme_engine_info_t *INFO`)

The function `gpgme_get_engine_info` returns a linked list of engine info structures in `INFO`. Each info structure describes the defaults of one configured backend.

The memory for the info structures is allocated the first time this function is invoked, and must not be freed by the caller.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, and a system error if the memory could not be allocated.

Here is an example how you can provide more diagnostics if you receive an error message which indicates that the crypto engine is invalid.

```
gpgme_ctx_t ctx;
gpgme_error_t err;

[...]

if (gpgme_err_code (err) == GPG_ERR_INV_ENGINE)
{
    gpgme_engine_info_t info;
    err = gpgme_get_engine_info (&info);
    if (!err)
    {
        while (info && info->protocol != gpgme_get_protocol (ctx))
            info = info->next;
        if (!info)
            fprintf (stderr, "GPGME compiled without support for protocol %s",
                    gpgme_get_protocol_name (info->protocol));
        else if (info->file_name && !info->version)
            fprintf (stderr, "Engine %s not installed properly",
                    info->file_name);
        else if (info->file_name && info->version && info->req_version)
            fprintf (stderr, "Engine %s version %s installed, "
                    "but at least version %s required", info->file_name,
                    info->version, info->req_version);
        else
            fprintf (stderr, "Unknown problem with engine for protocol %s",
                    gpgme_get_protocol_name (info->protocol));
    }
}
```

File: gpgme.info, Node: Engine Configuration, Next: OpenPGP, Prev: Engine Information, Up: Protocols and Engines

### 3.3 Engine Configuration

=====

You can change the configuration of a backend engine, and thus change the executable program and configuration directory to be used. You can make these changes the default or set them for some contexts individually.

-- Function: `gpgme_error_t gpgme_set_engine_info`  
(`gpgme_protocol_t PROTO`, `const char *FILE_NAME`,  
`const char *HOME_DIR`)  
SINCE: 1.1.0

The function `gpgme_set_engine_info` changes the default configuration of the crypto engine implementing the protocol `PROTO`.

`FILE_NAME` is the file name of the executable program implementing this protocol, and `HOME_DIR` is the directory name of the configuration directory for this crypto engine. If `HOME_DIR` is `NULL`, the engines default will be used.

The new defaults are not applied to already created GPGME contexts.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, or an error code on failure.

The functions `gpgme_ctx_get_engine_info` and `gpgme_ctx_set_engine_info` can be used to change the engine configuration per context. \*Note Crypto Engine::.

File: gpgme.info, Node: OpenPGP, Next: Cryptographic Message Syntax, Prev: Engine Configuration, Up: Protocols and Engines

### 3.4 OpenPGP

=====

OpenPGP is implemented by GnuPG, the GNU Privacy Guard. This is the first protocol that was supported by GPGME.

The OpenPGP protocol is specified by `GPGME_PROTOCOL_OpenPGP`.

File: gpgme.info, Node: Cryptographic Message Syntax, Next: Assuan, Prev: OpenPGP, Up: Protocols and Engines

### 3.5 Cryptographic Message Syntax

=====

CMS is implemented by GpgSM, the S/MIME implementation for GnuPG.

The CMS protocol is specified by GPGME\_PROTOCOL\_CMS.

File: gpgme.info, Node: Assuan, Prev: Cryptographic Message Syntax, Up: Protocols and Engines

### 3.6 Assuan

=====

Assuan is the RPC library used by the various GnuPG components. The Assuan protocol allows one to talk to arbitrary Assuan servers using GPGME. \*Note Using the Assuan protocol::

The ASSUAN protocol is specified by GPGME\_PROTOCOL\_ASSUAN.

File: gpgme.info, Node: Algorithms, Next: Error Handling, Prev: Protocols and Engines, Up: Top

## 4 Algorithms

\*\*\*\*\*

The crypto backends support a variety of algorithms used in public key cryptography.(1) The following sections list the identifiers used to denote such an algorithm.

\* Menu:

\* Public Key Algorithms:: A list of all public key algorithms.

\* Hash Algorithms:: A list of all hash algorithms.

----- Footnotes -----

(1) Some engines also provide symmetric only encryption; see the description of the encryption function on how to use this.

File: gpgme.info, Node: Public Key Algorithms, Next: Hash Algorithms, Up: Algorithms

### 4.1 Public Key Algorithms

=====

Public key algorithms are used for encryption, decryption, signing and verification of signatures.

-- Data type: enum gpgme\_pubkey\_algo\_t

The gpgme\_pubkey\_algo\_t type specifies the set of all public key algorithms that are supported by GPGME. Possible values are:

**GPGME\_PK\_RSA**

This value indicates the RSA (Rivest, Shamir, Adleman) algorithm.

**GPGME\_PK\_RSA\_E**

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for encryption and decryption only.

**GPGME\_PK\_RSA\_S**

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for signing and verification only.

**GPGME\_PK\_DSA**

This value indicates DSA, the Digital Signature Algorithm.

**GPGME\_PK\_ELG**

This value indicates ElGamal.

**GPGME\_PK\_ELG\_E**

This value also indicates ElGamal and is used specifically in GnuPG.

**GPGME\_PK\_ECC**

SINCE: 1.5.0

This value is a generic indicator for elliptic curve algorithms.

**GPGME\_PK\_ECDSA**

SINCE: 1.3.0

This value indicates ECDSA, the Elliptic Curve Digital Signature Algorithm as defined by FIPS 186-2 and RFC-6637.

**GPGME\_PK\_ECDH**

SINCE: 1.3.0

This value indicates ECDH, the Elliptic Curve Diffie-Hellmann encryption algorithm as defined by RFC-6637.

**GPGME\_PK\_EDDSA**

SINCE: 1.7.0

This value indicates the EdDSA algorithm.

-- Function: const char \* gpgme\_pubkey\_algo\_name  
(gpgme\_pubkey\_algo\_t ALGO)

The function gpgme\_pubkey\_algo\_name returns a pointer to a statically allocated string containing a description of the public key algorithm ALGO. This string can be used to output the name of the public key algorithm to the user.

If ALGO is not a valid public key algorithm, NULL is returned.

-- Function: char \* gpgme\_pubkey\_algo\_string (gpgme\_subkey\_t KEY)  
SINCE: 1.7.0

The function gpgme\_pubkey\_algo\_string is a convenience function to build and return an algorithm string in the same way GnuPG does (e.g. rsa2048 or ed25519). The caller must free the result using gpgme\_free. On error (e.g. invalid argument or memory exhausted), the function returns NULL and sets ERRNO.

File: gpgme.info, Node: Hash Algorithms, Prev: Public Key Algorithms, Up: Algorithms

## 4.2 Hash Algorithms

=====

Hash (message digest) algorithms are used to compress a long message to make it suitable for public key cryptography.

-- Data type: enum gpgme\_hash\_algo\_t

The gpgme\_hash\_algo\_t type specifies the set of all hash algorithms that are supported by GPGME. Possible values are:

GPGME\_MD\_MD5  
GPGME\_MD\_SHA1  
GPGME\_MD\_RMD160  
GPGME\_MD\_MD2  
GPGME\_MD\_TIGER  
GPGME\_MD\_HAVAL  
GPGME\_MD\_SHA256  
GPGME\_MD\_SHA384  
GPGME\_MD\_SHA512  
GPGME\_MD\_SHA224

SINCE: 1.5.0

GPGME\_MD\_MD4

GPGME\_MD\_CRC32  
GPGME\_MD\_CRC32\_RFC1510  
GPGME\_MD\_CRC24\_RFC2440

-- Function: const char \* gpgme\_hash\_algo\_name (gpgme\_hash\_algo\_t ALGO)

The function gpgme\_hash\_algo\_name returns a pointer to a statically allocated string containing a description of the hash algorithm ALGO. This string can be used to output the name of the hash algorithm to the user.

If ALGO is not a valid hash algorithm, NULL is returned.

File: gpgme.info, Node: Error Handling, Next: Exchanging Data, Prev: Algorithms, Up: Top

## 5 Error Handling

\*\*\*\*\*

Many functions in GPGME can return an error if they fail. For this reason, the application should always catch the error condition and take appropriate measures, for example by releasing the resources and passing the error up to the caller, or by displaying a descriptive message to the user and cancelling the operation.

Some error values do not indicate a system error or an error in the operation, but the result of an operation that failed properly. For example, if you try to decrypt a tempered message, the decryption will fail. Another error value actually means that the end of a data buffer or list has been reached. The following descriptions explain for many error codes what they mean usually. Some error values have specific meanings if returned by a certain functions. Such cases are described in the documentation of those functions.

GPGME uses the libgpg-error library. This allows to share the error codes with other components of the GnuPG system, and thus pass error values transparently from the crypto engine, or some helper application of the crypto engine, to the user. This way no information is lost. As a consequence, GPGME does not use its own identifiers for error codes, but uses those provided by libgpg-error. They usually start with GPG\_ERR\_.

However, GPGME does provide aliases for the functions defined in libgpg-error, which might be preferred for name space consistency.

\* Menu:

\* Error Values::           The error value and what it means.

\* Error Sources::         A list of important error sources.

- \* Error Codes:: A list of important error codes.
- \* Error Strings:: How to get a descriptive string from a value.

File: gpgme.info, Node: Error Values, Next: Error Sources, Up: Error Handling

## 5.1 Error Values

=====

-- Data type: `gpgme_err_code_t`

The `gpgme_err_code_t` type is an alias for the libgpg-error type `gpg_err_code_t`. The error code indicates the type of an error, or the reason why an operation failed.

A list of important error codes can be found in the next section.

-- Data type: `gpgme_err_source_t`

The `gpgme_err_source_t` type is an alias for the libgpg-error type `gpg_err_source_t`. The error source has not a precisely defined meaning. Sometimes it is the place where the error happened, sometimes it is the place where an error was encoded into an error value. Usually the error source will give an indication to where to look for the problem. This is not always true, but it is attempted to achieve this goal.

A list of important error sources can be found in the next section.

-- Data type: `gpgme_error_t`

The `gpgme_error_t` type is an alias for the libgpg-error type `gpg_error_t`. An error value like this has always two components, an error code and an error source. Both together form the error value.

Thus, the error value can not be directly compared against an error code, but the accessor functions described below must be used. However, it is guaranteed that only 0 is used to indicate success (`GPG_ERR_NO_ERROR`), and that in this case all other parts of the error value are set to 0, too.

Note that in GPGME, the error source is used purely for diagnostical purposes. Only the error code should be checked to test for a certain outcome of a function. The manual only documents the error code part of an error value. The error source is left unspecified and might be anything.

-- Function: `static inline gpgme_err_code_t gpgme_err_code(gpgme_error_t ERR)`

The static inline function `gpgme_err_code` returns the

gpgme\_err\_code\_t component of the error value ERR. This function must be used to extract the error code from an error value in order to compare it with the GPG\_ERR\_\* error code macros.

-- Function: static inline gpgme\_err\_source\_t gpgme\_err\_source  
(gpgme\_error\_t ERR)

The static inline function gpgme\_err\_source returns the gpgme\_err\_source\_t component of the error value ERR. This function must be used to extract the error source from an error value in order to compare it with the GPG\_ERR\_SOURCE\_\* error source macros.

-- Function: static inline gpgme\_error\_t gpgme\_err\_make  
(gpgme\_err\_source\_t SOURCE, gpgme\_err\_code\_t CODE)

The static inline function gpgme\_err\_make returns the error value consisting of the error source SOURCE and the error code CODE.

This function can be used in callback functions to construct an error value to return it to the library.

-- Function: static inline gpgme\_error\_t gpgme\_error  
(gpgme\_err\_code\_t CODE)

The static inline function gpgme\_error returns the error value consisting of the default error source and the error code CODE.

For GPGME applications, the default error source is GPG\_ERR\_SOURCE\_USER\_1. You can define GPGME\_ERR\_SOURCE\_DEFAULT before including gpgme.h to change this default.

This function can be used in callback functions to construct an error value to return it to the library.

The libgpg-error library provides error codes for all system error numbers it knows about. If ERR is an unknown error number, the error code GPG\_ERR\_UNKNOWN\_ERRNO is used. The following functions can be used to construct error values from system errno numbers.

-- Function: gpgme\_error\_t gpgme\_err\_make\_from\_errno  
(gpgme\_err\_source\_t SOURCE, int ERR)

The function gpgme\_err\_make\_from\_errno is like gpgme\_err\_make, but it takes a system error like errno instead of a gpgme\_err\_code\_t error code.

-- Function: gpgme\_error\_t gpgme\_error\_from\_errno (int ERR)

The function gpgme\_error\_from\_errno is like gpgme\_error, but it takes a system error like errno instead of a gpgme\_err\_code\_t error code.

Sometimes you might want to map system error numbers to error codes directly, or map an error code representing a system error back to the system error number. The following functions can be used to do that.

-- Function: `gpgme_err_code_t gpgme_err_code_from_errno (int ERR)`

The function `gpgme_err_code_from_errno` returns the error code for the system error `ERR`. If `ERR` is not a known system error, the function returns `GPG_ERR_UNKNOWN_ERRNO`.

-- Function: `int gpgme_err_code_to_errno (gpgme_err_code_t ERR)`

The function `gpgme_err_code_to_errno` returns the system error for the error code `ERR`. If `ERR` is not an error code representing a system error, or if this system error is not defined on this system, the function returns 0.

File: `gpgme.info`, Node: Error Sources, Next: Error Codes, Prev: Error Values, Up: Error Handling

## 5.2 Error Sources

=====

The library `libgpg-error` defines an error source for every component of the GnuPG system. The error source part of an error value is not well defined. As such it is mainly useful to improve the diagnostic error message for the user.

If the error code part of an error value is 0, the whole error value will be 0. In this case the error source part is of course `GPG_ERR_SOURCE_UNKNOWN`.

The list of error sources that might occur in applications using GPGME is:

### `GPG_ERR_SOURCE_UNKNOWN`

The error source is not known. The value of this error source is 0.

### `GPG_ERR_SOURCE_GPGME`

The error source is GPGME itself. This is the default for errors that occur in the GPGME library.

### `GPG_ERR_SOURCE_GPG`

The error source is GnuPG, which is the crypto engine used for the OpenPGP protocol.

### `GPG_ERR_SOURCE_GPGSM`

The error source is GPGSM, which is the crypto engine used for the CMS protocol.

#### GPG\_ERR\_SOURCE\_GCRYPT

The error source is libgcrypt, which is used by crypto engines to perform cryptographic operations.

#### GPG\_ERR\_SOURCE\_GPGAGENT

The error source is gpg-agent, which is used by crypto engines to perform operations with the secret key.

#### GPG\_ERR\_SOURCE\_PINENTRY

The error source is pinentry, which is used by gpg-agent to query the passphrase to unlock a secret key.

#### GPG\_ERR\_SOURCE\_SCD

The error source is the SmartCard Daemon, which is used by gpg-agent to delegate operations with the secret key to a SmartCard.

#### GPG\_ERR\_SOURCE\_KEYBOX

The error source is libkbox, a library used by the crypto engines to manage local keyrings.

#### GPG\_ERR\_SOURCE\_USER\_1

#### GPG\_ERR\_SOURCE\_USER\_2

#### GPG\_ERR\_SOURCE\_USER\_3

#### GPG\_ERR\_SOURCE\_USER\_4

These error sources are not used by any GnuPG component and can be used by other software. For example, applications using GPGME can use them to mark error values coming from callback handlers. Thus GPG\_ERR\_SOURCE\_USER\_1 is the default for errors created with gpgme\_error and gpgme\_error\_from\_errno, unless you define GPGME\_ERR\_SOURCE\_DEFAULT before including gpgme.h.

File: gpgme.info, Node: Error Codes, Next: Error Strings, Prev: Error Sources, Up: Error Handling

### 5.3 Error Codes

=====

The library libpgp-error defines many error values. Most of them are not used by GPGME directly, but might be returned by GPGME because it received them from the crypto engine. The below list only includes such error codes that have a specific meaning in GPGME, or which are so common that you should know about them.

#### GPG\_ERR\_EOF

This value indicates the end of a list, buffer or file.

#### GPG\_ERR\_NO\_ERROR

This value indicates success. The value of this error code is 0. Also, it is guaranteed that an error value made from the error code 0 will be 0 itself (as a whole). This means that the error source information is lost for this error code, however, as this error code indicates that no error occurred, this is generally not a problem.

#### GPG\_ERR\_GENERAL

This value means that something went wrong, but either there is not enough information about the problem to return a more useful error value, or there is no separate error value for this type of problem.

#### GPG\_ERR\_ENOMEM

This value means that an out-of-memory condition occurred.

#### GPG\_ERR\_E...

System errors are mapped to GPG\_ERR\_FOO where FOO is the symbol for the system error.

#### GPG\_ERR\_INV\_VALUE

This value means that some user provided data was out of range. This can also refer to objects. For example, if an empty `gpgme_data_t` object was expected, but one containing data was provided, this error value is returned.

#### GPG\_ERR\_UNUSABLE\_PUBKEY

This value means that some recipients for a message were invalid.

#### GPG\_ERR\_UNUSABLE\_SECKEY

This value means that some signers were invalid.

#### GPG\_ERR\_NO\_DATA

This value means that a `gpgme_data_t` object which was expected to have content was found empty.

#### GPG\_ERR\_CONFLICT

This value means that a conflict of some sort occurred.

#### GPG\_ERR\_NOT\_IMPLEMENTED

This value indicates that the specific function (or operation) is not implemented. This error should never happen. It can only occur if you use certain values or configuration options which do not work, but for which we think that they should work at some later time.

#### GPG\_ERR\_DECRYPT\_FAILED

This value indicates that a decryption operation was unsuccessful.

#### GPG\_ERR\_BAD\_PASSPHRASE

This value means that the user did not provide a correct passphrase when requested.

#### GPG\_ERR\_CANCELED

This value means that the operation was canceled.

#### GPG\_ERR\_INV\_ENGINE

This value means that the engine that implements the desired protocol is currently not available. This can either be because the sources were configured to exclude support for this engine, or because the engine is not installed properly.

#### GPG\_ERR\_AMBIGUOUS\_NAME

This value indicates that a user ID or other specifier did not specify a unique key.

#### GPG\_ERR\_WRONG\_KEY\_USAGE

This value indicates that a key is not used appropriately.

#### GPG\_ERR\_CERT\_REVOKED

This value indicates that a key signature was revoked.

#### GPG\_ERR\_CERT\_EXPIRED

This value indicates that a key signature expired.

#### GPG\_ERR\_NO\_CRL\_KNOWN

This value indicates that no certificate revocation list is known for the certificate.

#### GPG\_ERR\_NO\_POLICY\_MATCH

This value indicates that a policy issue occurred.

#### GPG\_ERR\_NO\_SECKEY

This value indicates that no secret key for the user ID is available.

#### GPG\_ERR\_MISSING\_CERT

This value indicates that a key could not be imported because the issuer certificate is missing.

#### GPG\_ERR\_BAD\_CERT\_CHAIN

This value indicates that a key could not be imported because its certificate chain is not good, for example it could be too long.

#### GPG\_ERR\_UNSUPPORTED\_ALGORITHM

This value means a verification failed because the cryptographic algorithm is not supported by the crypto backend.

#### GPG\_ERR\_BAD\_SIGNATURE

This value means a verification failed because the signature is bad.

#### GPG\_ERR\_NO\_PUBKEY

This value means a verification failed because the public key is not available.

#### GPG\_ERR\_USER\_1

#### GPG\_ERR\_USER\_2

...

#### GPG\_ERR\_USER\_16

These error codes are not used by any GnuPG component and can be freely used by other software. Applications using GPGME might use them to mark specific errors returned by callback handlers if no suitable error codes (including the system errors) for these errors exist already.

File: gpgme.info, Node: Error Strings, Prev: Error Codes, Up: Error Handling

### 5.4 Error Strings

=====

-- Function: const char \* gpgme\_strerror (gpgme\_error\_t ERR)

The function gpgme\_strerror returns a pointer to a statically allocated string containing a description of the error code contained in the error value ERR. This string can be used to output a diagnostic message to the user.

This function is not thread safe. Use gpgme\_strerror\_r in multi-threaded programs.

-- Function: int gpgme\_strerror\_r (gpgme\_error\_t ERR, char \*BUF, size\_t BUFLen)

The function gpgme\_strerror\_r returns the error string for ERR in the user-supplied buffer BUF of size BUFLen. This function is, in contrast to gpgme\_strerror, thread-safe if a thread-safe strerror\_r function is provided by the system. If the function succeeds, 0 is returned and BUF contains the string describing the error. If the buffer was not large enough, ERANGE is returned and BUF contains as much of the beginning of the error string as fits into the buffer.

-- Function: const char \* gpgme\_strsource (gpgme\_error\_t ERR)

The function `gpgme_strerror` returns a pointer to a statically allocated string containing a description of the error source contained in the error value `ERR`. This string can be used to output a diagnostic message to the user.

The following example illustrates the use of `gpgme_strerror`:

```
gpgme_ctx_t ctx;
gpgme_error_t err = gpgme_new (&ctx);
if (err)
{
    fprintf (stderr, "%s: creating GpgME context failed: %s: %s\n",
            argv[0], gpgme_strerror (err), gpgme_strerror (err));
    exit (1);
}
```

File: `gpgme.info`, Node: `Exchanging Data`, Next: `Contexts`, Prev: `Error Handling`, Up: `Top`

## 6 Exchanging Data

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A lot of data has to be exchanged between the user and the crypto engine, like plaintext messages, ciphertext, signatures and information about the keys. The technical details about exchanging the data information are completely abstracted by GPGME. The user provides and receives the data via `gpgme_data_t` objects, regardless of the communication protocol between GPGME and the crypto engine in use.

-- Data type: `gpgme_data_t`

The `gpgme_data_t` type is a handle for a container for generic data, which is used by GPGME to exchange data with the user.

`gpgme_data_t` objects do not provide notifications on events. It is assumed that read and write operations are blocking until data is available. If this is undesirable, the application must ensure that all GPGME data operations always have data available, for example by using memory buffers or files rather than pipes or sockets. This might be relevant, for example, if the external event loop mechanism is used.

-- Data type: `gpgme_off_t`

SINCE: 1.4.1

On POSIX platforms the `gpgme_off_t` type is an alias for `off_t`; it may be used interchangeably. On Windows platforms `gpgme_off_t` is defined as a long (i.e. 32 bit) for 32 bit Windows and as a 64 bit signed integer for 64 bit Windows.

-- Data type: `gpgme_ssize_t`

The `gpgme_ssize_t` type is an alias for `ssize_t`. It has only been introduced to overcome portability problems pertaining to the declaration of `ssize_t` by different toolchains.

\* Menu:

\* Creating Data Buffers:: Creating new data buffers.

\* Destroying Data Buffers:: Releasing data buffers.

\* Manipulating Data Buffers:: Operations on data buffers.

File: `gpgme.info`, Node: Creating Data Buffers, Next: Destroying Data Buffers, Up: Exchanging Data

## 6.1 Creating Data Buffers

=====

Data objects can be based on memory, files, or callback functions provided by the user. Not all operations are supported by all objects.

\* Menu:

\* Memory Based Data Buffers:: Creating memory based data buffers.

\* File Based Data Buffers:: Creating file based data buffers.

\* Callback Based Data Buffers:: Creating callback based data buffers.

File: `gpgme.info`, Node: Memory Based Data Buffers, Next: File Based Data Buffers, Up: Creating Data Buffers

### 6.1.1 Memory Based Data Buffers

-----

Memory based data objects store all data in allocated memory. This is convenient, but only practical for an amount of data that is a fraction of the available physical memory. The data has to be copied from its source and to its destination, which can often be avoided by using one of the other data object

-- Function: `gpgme_error_t gpgme_data_new (gpgme_data_t *DH)`

The function `gpgme_data_new` creates a new `gpgme_data_t` object and returns a handle for it in `DH`. The data object is memory based and initially empty.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `DH` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_mem (gpgme_data_t *DH, const char *BUFFER, size_t SIZE, int COPY)`

The function `gpgme_data_new_from_mem` creates a new `gpgme_data_t` object and fills it with `SIZE` bytes starting from `BUFFER`.

If `COPY` is not zero, a private copy of the data is made. If `COPY` is zero, the data is taken from the specified buffer as needed, and the user has to ensure that the buffer remains valid for the whole life span of the data object.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `DH` or `BUFFER` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_file (gpgme_data_t *DH, const char *FILENAME, int COPY)`

The function `gpgme_data_new_from_file` creates a new `gpgme_data_t` object and fills it with the content of the file `FILENAME`.

If `COPY` is not zero, the whole file is read in at initialization time and the file is not used anymore after that. This is the only mode supported currently. Later, a value of zero for `COPY` might cause all reads to be delayed until the data is needed, but this is not yet implemented.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `DH` or `FILENAME` is not a valid pointer, `GPG_ERR_NOT_IMPLEMENTED` if `CODE` is zero, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_filepart (gpgme_data_t *DH, const char *FILENAME, FILE *FP, off_t OFFSET, size_t LENGTH)`

The function `gpgme_data_new_from_filepart` creates a new `gpgme_data_t` object and fills it with a part of the file specified by `FILENAME` or `FP`.

Exactly one of `FILENAME` and `FP` must be non-zero, the other must be zero. The argument that is not zero specifies the file from which `LENGTH` bytes are read into the data object, starting from `OFFSET`.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `DH` and exactly one of `FILENAME` and `FP` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

### 6.1.2 File Based Data Buffers

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File based data objects operate directly on file descriptors or streams. Only a small amount of data is stored in core at any time, so the size of the data objects is not limited by GPGME.

-- Function: `gpgme_error_t gpgme_data_new_from_fd (gpgme_data_t *DH, int FD)`

The function `gpgme_data_new_from_fd` creates a new `gpgme_data_t` object and uses the file descriptor `FD` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the file descriptor than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the file descriptor is set to blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_stream (gpgme_data_t *DH, FILE *STREAM)`

The function `gpgme_data_new_from_stream` creates a new `gpgme_data_t` object and uses the I/O stream `STREAM` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough

memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_estream`  
(`gpgme_data_t *DH`, `gpgmt_stream_t STREAM`)  
The function `gpgme_data_new_from_estream` creates a new `gpgme_data_t` object and uses the `gpgmt` stream `STREAM` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

File: `gpgme.info`, Node: Callback Based Data Buffers, Prev: File Based Data Buffers, Up: Creating Data Buffers

### 6.1.3 Callback Based Data Buffers

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If neither memory nor file based data objects are a good fit for your application, you can implement the functions a data object provides yourself and create a data object from these callback functions.

-- Data type: `ssize_t (*gpgme_data_read_cb_t)` (`void *HANDLE`, `void *BUFFER`, `size_t SIZE`)  
The `gpgme_data_read_cb_t` type is the type of functions which GPGME calls if it wants to read data from a user-implemented data object. The function should read up to `SIZE` bytes from the current read position into the space starting at `BUFFER`. The `HANDLE` is provided by the user at data object creation time.

Note that GPGME assumes that the read blocks until data is available. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function should return the number of bytes read, 0 on EOF, and -1 on error. If an error occurs, `ERRNO` should be set to describe the type of the error.

-- Data type: `ssize_t (*gpgme_data_write_cb_t) (void *HANDLE, const void *BUFFER, size_t SIZE)`

The `gpgme_data_write_cb_t` type is the type of functions which GPGME calls if it wants to write data to a user-implemented data object. The function should write up to `SIZE` bytes to the current write position from the space starting at `BUFFER`. The `HANDLE` is provided by the user at data object creation time.

Note that GPGME assumes that the write blocks until data is available. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function should return the number of bytes written, and `-1` on error. If an error occurs, `ERRNO` should be set to describe the type of the error.

-- Data type: `off_t (*gpgme_data_seek_cb_t) (void *HANDLE, off_t OFFSET, int WHENCE)`

The `gpgme_data_seek_cb_t` type is the type of functions which GPGME calls if it wants to change the current read/write position in a user-implemented data object, just like the `lseek` function.

The function should return the new read/write position, and `-1` on error. If an error occurs, `ERRNO` should be set to describe the type of the error.

-- Data type: `void (*gpgme_data_release_cb_t) (void *HANDLE)`

The `gpgme_data_release_cb_t` type is the type of functions which GPGME calls if it wants to destroy a user-implemented data object. The `HANDLE` is provided by the user at data object creation time.

-- Data type: `struct gpgme_data_cbs`

This structure is used to store the data callback interface functions described above. It has the following members:

`gpgme_data_read_cb_t read`

This is the function called by GPGME to read data from the data object. It is only required for input data object.

`gpgme_data_write_cb_t write`

This is the function called by GPGME to write data to the data object. It is only required for output data object.

`gpgme_data_seek_cb_t seek`

This is the function called by GPGME to change the current read/write pointer in the data object (if available). It is optional.

gpgme\_data\_release\_cb\_t release

This is the function called by GPGME to release a data object.

It is optional.

-- Function: gpgme\_error\_t gpgme\_data\_new\_from\_cbs (gpgme\_data\_t \*DH,  
gpgme\_data\_cbs\_t CBS, void \*HANDLE)

The function gpgme\_data\_new\_from\_cbs creates a new gpgme\_data\_t object and uses the user-provided callback functions to operate on the data object.

The handle HANDLE is passed as first argument to the callback functions. This can be used to identify this data object.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, and GPG\_ERR\_ENOMEM if not enough memory is available.

File: gpgme.info, Node: Destroying Data Buffers, Next: Manipulating Data Buffers, Prev: Creating Data Buffers, Up: Exchanging Data

## 6.2 Destroying Data Buffers

=====

-- Function: void gpgme\_data\_release (gpgme\_data\_t DH)

The function gpgme\_data\_release destroys the data object with the handle DH. It releases all associated resources that were not provided by the user in the first place.

-- Function: char \* gpgme\_data\_release\_and\_get\_mem (gpgme\_data\_t DH,  
size\_t \*LENGTH)

The function gpgme\_data\_release\_and\_get\_mem is like gpgme\_data\_release, except that it returns the data buffer and its length that was provided by the object.

The user has to release the buffer with gpgme\_free. In case the user provided the data buffer in non-copy mode, a copy will be made for this purpose.

In case an error returns, or there is no suitable data buffer that can be returned to the user, the function will return NULL. In any case, the data object DH is destroyed.

-- Function: void gpgme\_free (void \*BUFFER)

SINCE: 1.1.1

The function gpgme\_free releases the memory returned by gpgme\_data\_release\_and\_get\_mem and gpgme\_pubkey\_algo\_string.

It should be used instead of the system libraries free function in case different allocators are used by a program. This is often the case if gpgme is used under Windows as a DLL.

File: gpgme.info, Node: Manipulating Data Buffers, Prev: Destroying Data Buffers, Up: Exchanging Data

### 6.3 Manipulating Data Buffers

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Data buffers contain data and meta-data. The following operations can be used to manipulate both.

\* Menu:

- \* Data Buffer I/O Operations:: I/O operations on data buffers.
- \* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
- \* Data Buffer Convenience:: Convenience function for data buffers.

File: gpgme.info, Node: Data Buffer I/O Operations, Next: Data Buffer Meta-Data, Up: Manipulating Data Buffers

#### 6.3.1 Data Buffer I/O Operations

-----

-- Function: `ssize_t gpgme_data_read (gpgme_data_t DH, void *BUFFER, size_t LENGTH)`

The function `gpgme_data_read` reads up to `LENGTH` bytes from the data object with the handle `DH` into the space starting at `BUFFER`.

If no error occurs, the actual amount read is returned. If the end of the data object is reached, the function returns 0.

In all other cases, the function returns -1 and sets `ERRNO`.

-- Function: `ssize_t gpgme_data_write (gpgme_data_t DH, const void *BUFFER, size_t SIZE)`

The function `gpgme_data_write` writes up to `SIZE` bytes starting from `BUFFER` into the data object with the handle `DH` at the current write position.

The function returns the number of bytes actually written, or -1 if an error occurs. If an error occurs, `ERRNO` is set.

-- Function: `off_t gpgme_data_seek (gpgme_data_t DH, off_t OFFSET, int WHENCE)`

The function `gpgme_data_seek` changes the current read/write

position.

The WHENCE argument specifies how the OFFSET should be interpreted. It must be one of the following symbolic constants:

#### SEEK\_SET

Specifies that OFFSET is a count of characters from the beginning of the data object.

#### SEEK\_CUR

Specifies that OFFSET is a count of characters from the current file position. This count may be positive or negative.

#### SEEK\_END

Specifies that OFFSET is a count of characters from the end of the data object. A negative count specifies a position within the current extent of the data object; a positive count specifies a position past the current end. If you set the position past the current end, and actually write data, you will extend the data object with zeros up to that position.

If successful, the function returns the resulting file position, measured in bytes from the beginning of the data object. You can use this feature together with SEEK\_CUR to read the current read/write position.

If the function fails, -1 is returned and ERRNO is set.

File: gpgme.info, Node: Data Buffer Meta-Data, Next: Data Buffer Convenience, Prev: Data Buffer I/O Operations, Up: Manipulating Data Buffers

### 6.3.2 Data Buffer Meta-Data

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-- Function: char \* gpgme\_data\_get\_file\_name (gpgme\_data\_t DH)  
SINCE: 1.1.0

The function gpgme\_data\_get\_file\_name returns a pointer to a string containing the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

If no error occurs, the string containing the file name is returned. Otherwise, NULL will be returned.

-- Function: `gpgme_error_t gpgme_data_set_file_name (gpgme_data_t DH, const char *FILE_NAME)`  
SINCE: 1.1.0

The function `gpgme_data_set_file_name` sets the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

The function returns the error code `GPG_ERR_INV_VALUE` if `DH` is not a valid pointer and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Data type: `enum gpgme_data_encoding_t`

The `gpgme_data_encoding_t` type specifies the encoding of a `gpgme_data_t` object. For input data objects, the encoding is useful to give the backend a hint on the type of data. For output data objects, the encoding can specify the output data format on certain operations. Please note that not all backends support all encodings on all operations. The following data types are available:

`GPGME_DATA_ENCODING_NONE`

This specifies that the encoding is not known. This is the default for a new data object. The backend will try its best to detect the encoding automatically.

`GPGME_DATA_ENCODING_BINARY`

This specifies that the data is encoding in binary form; i.e. there is no special encoding.

`GPGME_DATA_ENCODING_BASE64`

This specifies that the data is encoded using the Base-64 encoding scheme as used by MIME and other protocols.

`GPGME_DATA_ENCODING_ARMOR`

This specifies that the data is encoded in an armored form as used by OpenPGP and PEM.

`GPGME_DATA_ENCODING_MIME`

SINCE: 1.7.0

This specifies that the data is encoded as a MIME part.

`GPGME_DATA_ENCODING_URL`

SINCE: 1.2.0

The data is a list of linefeed delimited URLs. This is only

useful with `gpgme_op_import`.

#### GPGME\_DATA\_ENCODING\_URL0

SINCE: 1.2.0

The data is a list of binary zero delimited URLs. This is only useful with `gpgme_op_import`.

#### GPGME\_DATA\_ENCODING\_URLESC

SINCE: 1.2.0

The data is a list of linefeed delimited URLs with all control and space characters percent escaped. This mode is not yet implemented.

-- Function: `gpgme_data_encoding_t gpgme_data_get_encoding(gpgme_data_t DH)`

The function `gpgme_data_get_encoding` returns the encoding of the data object with the handle `DH`. If `DH` is not a valid pointer (e.g. `NULL`) `GPGME_DATA_ENCODING_NONE` is returned.

-- Function: `gpgme_error_t gpgme_data_set_encoding(gpgme_data_t DH, gpgme_data_encoding_t ENC)`

The function `gpgme_data_set_encoding` changes the encoding of the data object with the handle `DH` to `ENC`.

-- Function: `gpgme_error_t gpgme_data_set_flag(gpgme_data_t DH, const char *NAME, const char *VALUE)`

SINCE: 1.7.0

Some minor properties of the data object can be controlled with flags set by this function. The properties are identified by the following values for `NAME`:

##### size-hint

The value is a decimal number with the length `gpgme` shall assume for this data object. This is useful if the data is provided by callbacks or via file descriptors but the application knows the total size of the data. If this is set the OpenPGP engine may use this to decide on buffer allocation strategies and to provide a total value for its progress information.

This function returns 0 on success.

File: `gpgme.info`, Node: Data Buffer Convenience, Prev: Data Buffer Meta-Data, Up: Manipulating Data Buffers

### 6.3.3 Data Buffer Convenience Functions

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-- Data type: enum `gpgme_data_type_t`  
SINCE: 1.4.3

The `gpgme_data_type_t` type is used to return the detected type of the content of a data buffer.

#### `GPGME_DATA_TYPE_INVALID`

This is returned by `gpgme_data_identify` if it was not possible to identify the data. Reasons for this might be a non-seekable stream or a memory problem. The value is 0.

#### `GPGME_DATA_TYPE_UNKNOWN`

The type of the data is not known.

#### `GPGME_DATA_TYPE_PGP_SIGNED`

The data is an OpenPGP signed message. This may be a binary signature, a detached one or a cleartext signature.

#### `GPGME_DATA_TYPE_PGP_ENCRYPTED`

SINCE: 1.7.0

The data is an OpenPGP encrypted message.

#### `GPGME_DATA_TYPE_PGP_SIGNATURE`

SINCE: 1.7.0

The data is an OpenPGP detached signature.

#### `GPGME_DATA_TYPE_PGP_OTHER`

This is a generic OpenPGP message. In most cases this will be encrypted data.

#### `GPGME_DATA_TYPE_PGP_KEY`

This is an OpenPGP key (private or public).

#### `GPGME_DATA_TYPE_CMS_SIGNED`

This is a CMS signed message.

#### `GPGME_DATA_TYPE_CMS_ENCRYPTED`

This is a CMS encrypted (enveloped data) message.

#### `GPGME_DATA_TYPE_CMS_OTHER`

This is used for other CMS message types.

#### `GPGME_DATA_TYPE_X509_CERT`

The data is a X.509 certificate

#### `GPGME_DATA_TYPE_PKCS12`

The data is a PKCS#12 message. This is commonly used to exchange private keys for X.509.

-- Function: `gpgme_data_type_t gpgme_data_identify (gpgme_data_t DH)`  
SINCE: 1.4.3

The function `gpgme_data_identify` returns the type of the data

with the handle DH. If it is not possible to perform the identification, the function returns zero (GPGME\_DATA\_TYPE\_INVALID). Note that depending on how the data object has been created the identification may not be possible or the data object may change its internal state (file pointer moved). For file or memory based data object, the state should not change.

File: gpgme.info, Node: Contexts, Next: UI Server Protocol, Prev: Exchanging Data, Up: Top

## 7 Contexts

\*\*\*\*\*

All cryptographic operations in GPGME are performed within a context, which contains the internal state of the operation as well as configuration parameters. By using several contexts you can run several cryptographic operations in parallel, with different configuration.

-- Data type: gpgme\_ctx\_t

The gpgme\_ctx\_t type is a handle for a GPGME context, which is used to hold the configuration, status and result of cryptographic operations.

\* Menu:

- \* Creating Contexts:: Creating new GPGME contexts.
- \* Destroying Contexts:: Releasing GPGME contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with GPGME.
- \* Trust Item Management:: Managing trust items with GPGME.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations
- \* Run Control:: Controlling how operations are run.

File: gpgme.info, Node: Creating Contexts, Next: Destroying Contexts, Up: Contexts

### 7.1 Creating Contexts

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-- Function: gpgme\_error\_t gpgme\_new (gpgme\_ctx\_t \*CTX)

The function gpgme\_new creates a new gpgme\_ctx\_t object and returns a handle for it in CTX.

The function returns the error code GPG\_ERR\_NO\_ERROR if the context was successfully created, GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, and GPG\_ERR\_ENOMEM if not enough memory is

available. Also, it returns `GPG_ERR_NOT_OPERATIONAL` if `gpgme_check_version` was not called to initialize GPGME, and `GPG_ERR_SELFTEST_FAILED` if a selftest failed. Currently, the only selftest is for Windows MingW32 targets to see if `-mms-bitfields` was used (as required).

File: `gpgme.info`, Node: Destroying Contexts, Next: Result Management, Prev: Creating Contexts, Up: Contexts

## 7.2 Destroying Contexts

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-- Function: `void gpgme_release (gpgme_ctx_t CTX)`  
The function `gpgme_release` destroys the context with the handle `CTX` and releases all associated resources.

File: `gpgme.info`, Node: Result Management, Next: Context Attributes, Prev: Destroying Contexts, Up: Contexts

## 7.3 Result Management

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The detailed result of an operation is returned in operation-specific structures such as `gpgme_decrypt_result_t`. The corresponding retrieval functions such as `gpgme_op_decrypt_result` provide static access to the results after an operation completes. Those structures shall be considered read-only and an application must not allocate such a structure on its own. The following interfaces make it possible to detach a result structure from its associated context and give it a lifetime beyond that of the current operation or context.

-- Function: `void gpgme_result_ref (void *RESULT)`  
SINCE: 1.2.0

The function `gpgme_result_ref` acquires an additional reference for the result `RESULT`, which may be of any type `gpgme_*_result_t`. As long as the user holds a reference, the result structure is guaranteed to be valid and unmodified.

-- Function: `void gpgme_result_unref (void *RESULT)`  
SINCE: 1.2.0

The function `gpgme_result_unref` releases a reference for the result `RESULT`. If this was the last reference, the result structure will be destroyed and all resources associated to it will be released.

Note that a context may hold its own references to result structures,

typically until the context is destroyed or the next operation is started. In fact, these references are accessed through the `gpgme_op_*_result` functions.

File: `gpgme.info`, Node: Context Attributes, Next: Key Management, Prev: Result Management, Up: Contexts

## 7.4 Context Attributes

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### \* Menu:

- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting ASCII armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Pinentry Mode:: Choosing the pinentry mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
- \* Progress Meter Callback:: Being informed about the progress.
- \* Status Message Callback:: Status messages received from `gpg`.
- \* Context Flags:: Additional flags for a context.
- \* Locale:: Setting the locale of a context.
- \* Additional Logs:: Additional logs of a context.

File: `gpgme.info`, Node: Protocol Selection, Next: Crypto Engine, Up: Context Attributes

### 7.4.1 Protocol Selection

-----

-- Function: `gpgme_error_t gpgme_set_protocol (gpgme_ctx_t CTX, gpgme_protocol_t PROTO)`

The function `gpgme_set_protocol` sets the protocol used within the context `CTX` to `PROTO`. All crypto operations will be performed by the crypto engine configured for that protocol. \*Note Protocols and Engines::.

Setting the protocol with `gpgme_set_protocol` does intentionally not check if the crypto engine for that protocol is available and installed correctly. \*Note Engine Version Check::.

The function returns the error code `GPG_ERR_NO_ERROR` if the protocol could be set successfully, and `GPG_ERR_INV_VALUE` if `PROTOCOL` is not a valid protocol.

-- Function: `gpgme_protocol_t gpgme_get_protocol (gpgme_ctx_t CTX)`  
The function `gpgme_get_protocol` retrieves the protocol currently use with the context `CTX`.

File: `gpgme.info`, Node: Crypto Engine, Next: Setting the Sender, Prev: Protocol Selection, Up: Context Attributes

#### 7.4.2 Crypto Engine

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The following functions can be used to set and retrieve the configuration of the crypto engines of a specific context. The default can also be retrieved without any particular context. \*Note Engine Information::. The default can also be changed globally. \*Note Engine Configuration::.

-- Function: `gpgme_engine_info_t gpgme_ctx_get_engine_info (gpgme_ctx_t CTX)`  
SINCE: 1.1.0

The function `gpgme_ctx_get_engine_info` returns a linked list of engine info structures. Each info structure describes the configuration of one configured backend, as used by the context `CTX`.

The result is valid until the next invocation of `gpgme_ctx_set_engine_info` for this particular context.

This function can not fail.

-- Function: `gpgme_error_t gpgme_ctx_set_engine_info (gpgme_ctx_t CTX, gpgme_protocol_t PROTO, const char *FILE_NAME, const char *HOME_DIR)`  
SINCE: 1.1.0

The function `gpgme_ctx_set_engine_info` changes the configuration of the crypto engine implementing the protocol `PROTO` for the context `CTX`.

`FILE_NAME` is the file name of the executable program implementing this protocol, and `HOME_DIR` is the directory name of the configuration directory for this crypto engine. If `HOME_DIR` is `NULL`, the engines default will be used.

Currently this function must be used before starting the first crypto operation. It is unspecified if and when the changes will

take effect if the function is called after starting the first operation on the context CTX.

This function returns the error code GPG\_ERR\_NO\_ERROR if successful, or an error code on failure.

File: gpgme.info, Node: Setting the Sender, Next: ASCII Armor, Prev: Crypto Engine, Up: Context Attributes

#### 7.4.3 How to tell the engine the sender.

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Some engines can make use of the senders address, for example to figure out the best user id in certain trust models. For verification and signing of mails, it is thus suggested to let the engine know the sender ("From:") address. GPGME provides two functions to accomplish that. Note that the esoteric use of multiple "From:" addresses is not supported.

-- Function: gpgme\_error\_t gpgme\_set\_sender (gpgme\_ctx\_t CTX,  
int ADDRESS)

SINCE: 1.8.0

The function gpgme\_set\_sender specifies the sender address for use in sign and verify operations. ADDRESS is expected to be the addr-spec part of an address but may also be a complete mailbox address, in which case this function extracts the addr-spec from it. Using NULL for ADDRESS clears the sender address.

The function returns 0 on success or an error code on failure. The most likely failure is that no valid addr-spec was found in ADDRESS.

-- Function: const char \* gpgme\_get\_sender (gpgme\_ctx\_t CTX)

SINCE: 1.8.0

The function gpgme\_get\_sender returns the current sender address from the context, or NULL if none was set. The returned value is valid as long as the CTX is valid and gpgme\_set\_sender has not been called again.

File: gpgme.info, Node: ASCII Armor, Next: Text Mode, Prev: Setting the Sender, Up: Context Attributes

#### 7.4.4 ASCII Armor

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-- Function: void gpgme\_set\_armor (gpgme\_ctx\_t CTX, int YES)  
The function gpgme\_set\_armor specifies if the output should be ASCII armored. By default, output is not ASCII armored.

ASCII armored output is disabled if YES is zero, and enabled otherwise.

-- Function: int gpgme\_get\_armor (gpgme\_ctx\_t CTX)  
The function gpgme\_get\_armor returns 1 if the output is ASCII armored, and 0 if it is not, or if CTX is not a valid pointer.

File: gpgme.info, Node: Text Mode, Next: Offline Mode, Prev: ASCII Armor, Up: Context Attributes

#### 7.4.5 Text Mode

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-- Function: void gpgme\_set\_textmode (gpgme\_ctx\_t CTX, int YES)  
The function gpgme\_set\_textmode specifies if canonical text mode should be used. By default, text mode is not used.

Text mode is for example used for the RFC2015 signatures; note that the updated RFC 3156 mandates that the mail user agent does some preparations so that text mode is not needed anymore.

This option is only relevant to the OpenPGP crypto engine, and ignored by all other engines.

Canonical text mode is disabled if YES is zero, and enabled otherwise.

-- Function: int gpgme\_get\_textmode (gpgme\_ctx\_t CTX)  
The function gpgme\_get\_textmode returns 1 if canonical text mode is enabled, and 0 if it is not, or if CTX is not a valid pointer.

File: gpgme.info, Node: Offline Mode, Next: Pinentry Mode, Prev: Text Mode, Up: Context Attributes

#### 7.4.6 Offline Mode

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-- Function: void gpgme\_set\_offline (gpgme\_ctx\_t CTX, int YES)  
SINCE: 1.6.0

The function gpgme\_set\_offline specifies if offline mode should be used. Offline mode is disabled if YES is zero, and enabled otherwise. By default, offline mode is disabled.

The details of the offline mode depend on the used protocol and its backend engine. It may eventually be extended to be more stricter and for example completely disable the use of Dirmngr for any engine.

For the CMS protocol the offline mode specifies whether Dirmngr shall be used to do additional validation that might require connecting external services (e.g. CRL / OCSP checks). Here the offline mode only affects the keylist mode `GPGME_KEYLIST_MODE_VALIDATE`.

For the OpenPGP protocol offline mode entirely disables the use of the Dirmngr and will thus guarantee that no network connections are done as part of an operation on this context. It has only an effect with GnuPG versions 2.1.23 or later.

For all other protocols the offline mode is currently ignored.

-- Function: `int gpgme_get_offline (gpgme_ctx_t CTX)`  
SINCE: 1.6.0

The function `gpgme_get_offline` returns 1 if offline mode is enabled, and 0 if it is not, or if CTX is not a valid pointer.

File: `gpgme.info`, Node: Pinentry Mode, Next: Included Certificates, Prev: Offline Mode, Up: Context Attributes

#### 7.4.7 Pinentry Mode

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-- Function: `gpgme_error_t gpgme_set_pinentry_mode (gpgme_ctx_t CTX, gpgme_pinentry_mode_t MODE)`

SINCE: 1.4.0

The function `gpgme_set_pinentry_mode` specifies the pinentry mode to be used.

For GnuPG  $\geq$  2.1 this option is required to be set to `GPGME_PINENTRY_MODE_LOOPBACK` to enable the passphrase callback mechanism in GPGME through `gpgme_set_passphrase_cb`.

-- Function: `gpgme_pinentry_mode_t gpgme_get_pinentry_mode (gpgme_ctx_t CTX)`  
SINCE: 1.4.0

The function `gpgme_get_pinentry_mode` returns the mode set for the

context.

-- Data type: enum gpgme\_pinentry\_mode\_t  
SINCE: 1.4.0

The gpgme\_minentry\_mode\_t type specifies the set of possible pinentry modes that are supported by GPGME if GnuPG >= 2.1 is used. The following modes are supported:

GPGME\_PINENTRY\_MODE\_DEFAULT  
SINCE: 1.4.0

Use the default of the agent, which is ask.

GPGME\_PINENTRY\_MODE\_ASK  
SINCE: 1.4.0

Force the use of the Pinentry.

GPGME\_PINENTRY\_MODE\_CANCEL  
SINCE: 1.4.0

Emulate use of Pinentry's cancel button.

GPGME\_PINENTRY\_MODE\_ERROR  
SINCE: 1.4.0

Return a Pinentry error No Pinentry.

GPGME\_PINENTRY\_MODE\_LOOPBACK  
SINCE: 1.4.0

Redirect Pinentry queries to the caller. This enables the use of gpgme\_set\_passphrase\_cb because pinentry queries are redirected to gpgme.

Note: For 2.1.0 - 2.1.12 this mode requires allow-loopback-pinentry to be enabled in the gpg-agent.conf or an agent started with that option.

File: gpgme.info, Node: Included Certificates, Next: Key Listing Mode, Prev: Pinentry Mode, Up: Context Attributes

#### 7.4.8 Included Certificates

-----

-- Function: void gpgme\_set\_include\_certs (gpgme\_ctx\_t CTX,

int NR\_OF\_CERTS)

The function `gpgme_set_include_certs` specifies how many certificates should be included in an S/MIME signed message. By default, only the senders certificate is included. The possible values of `NR_OF_CERTS` are:

`GPGME_INCLUDE_CERTS_DEFAULT`

SINCE: 1.0.3

Fall back to the default of the crypto backend. This is the default for GPGME.

-2

Include all certificates except the root certificate.

-1

Include all certificates.

0

Include no certificates.

1

Include the senders certificate only.

n

Include the first n certificates of the certificates path, starting from the senders certificate. The number n must be positive.

Values of `NR_OF_CERTS` smaller than -2 are undefined.

This option is only relevant to the CMS crypto engine, and ignored by all other engines.

-- Function: `int gpgme_get_include_certs (gpgme_ctx_t CTX)`

The function `gpgme_get_include_certs` returns the number of certificates to include into an S/MIME signed message.

File: `gpgme.info`, Node: Key Listing Mode, Next: Passphrase Callback, Prev: Included Certificates, Up: Context Attributes

#### 7.4.9 Key Listing Mode

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-- Function: `gpgme_error_t gpgme_set_keylist_mode (gpgme_ctx_t CTX, gpgme_keylist_mode_t MODE)`

The function `gpgme_set_keylist_mode` changes the default behaviour of the key listing functions. The value in `MODE` is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_KEYLIST_MODE_LOCAL`

The `GPGME_KEYLIST_MODE_LOCAL` symbol specifies that the local

keyring should be searched for keys in the keylisting operation. This is the default.

Using only this option results in a --list-keys.

#### GPGME\_KEYLIST\_MODE\_EXTERN

The GPGME\_KEYLIST\_MODE\_EXTERN symbol specifies that an external source should be searched for keys in the keylisting operation. The type of external source is dependent on the crypto engine used and whether it is combined with GPGME\_KEYLIST\_MODE\_LOCAL. For example, it can be a remote keyserver or LDAP certificate server.

Using only this option results in a --search-keys for GPGME\_PROTOCOL\_OpenPGP and something similar to --list-external-keys for GPGME\_PROTOCOL\_CMS.

#### GPGME\_KEYLIST\_MODE\_LOCATE

This is a shortcut for the combination of GPGME\_KEYLIST\_MODE\_LOCAL and GPGME\_KEYLIST\_MODE\_EXTERN, which results in a --locate-keys for GPGME\_PROTOCOL\_OpenPGP.

#### GPGME\_KEYLIST\_MODE\_SIGS

The GPGME\_KEYLIST\_MODE\_SIGS symbol specifies that the key signatures should be included in the listed keys.

#### GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS

SINCE: 1.1.1

The GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS symbol specifies that the signature notations on key signatures should be included in the listed keys. This only works if GPGME\_KEYLIST\_MODE\_SIGS is also enabled.

#### GPGME\_KEYLIST\_MODE\_WITH\_TOFU

SINCE: 1.7.0

The GPGME\_KEYLIST\_MODE\_WITH\_TOFU symbol specifies that information pertaining to the TOFU trust model should be included in the listed keys.

#### GPGME\_KEYLIST\_MODE\_WITH\_SECRET

SINCE: 1.5.1

The GPGME\_KEYLIST\_MODE\_WITH\_SECRET returns information about the presence of a corresponding secret key in a public key listing. A public key listing with this mode is slower than a

standard listing but can be used instead of a second run to list the secret keys. This is only supported for GnuPG versions  $\geq 2.1$ .

#### GPGME\_KEYLIST\_MODE\_EPHEMERAL

SINCE: 1.2.0

The GPGME\_KEYLIST\_MODE\_EPHEMERAL symbol specifies that keys flagged as ephemeral are included in the listing.

#### GPGME\_KEYLIST\_MODE\_VALIDATE

SINCE: 0.4.5

The GPGME\_KEYLIST\_MODE\_VALIDATE symbol specifies that the backend should do key or certificate validation and not just get the validity information from an internal cache. This might be an expensive operation and is in general not useful. Currently only implemented for the S/MIME backend and ignored for other backends.

At least one of GPGME\_KEYLIST\_MODE\_LOCAL and GPGME\_KEYLIST\_MODE\_EXTERN must be specified. For future binary compatibility, you should get the current mode with `gpgme_get_keylist_mode` and modify it by setting or clearing the appropriate bits, and then using that calculated value in the `gpgme_set_keylisting_mode` operation. This will leave all other bits in the mode value intact (in particular those that are not used in the current version of the library).

The function returns the error code `GPG_ERR_NO_ERROR` if the mode could be set correctly, and `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer or `MODE` is not a valid mode.

-- Function: `gpgme_keylist_mode_t gpgme_get_keylist_mode(gpgme_ctx_t CTX)`

The function `gpgme_get_keylist_mode` returns the current key listing mode of the context `CTX`. This value can then be modified and used in a subsequent `gpgme_set_keylist_mode` operation to only affect the desired bits (and leave all others intact).

The function returns 0 if `CTX` is not a valid pointer, and the current mode otherwise. Note that 0 is not a valid mode value.

File: `gpgme.info`, Node: `Passphrase Callback`, Next: `Progress Meter Callback`, Prev: `Key Listing Mode`, Up: `Context Attributes`

#### 7.4.10 Passphrase Callback

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-- Data type: `gpgme_error_t (*gpgme_passphrase_cb_t)(void *HOOK, const char *UID_HINT, const char *PASSPHRASE_INFO, int PREV_WAS_BAD, int FD)`

The `gpgme_passphrase_cb_t` type is the type of functions usable as passphrase callback function.

The argument `UID_HINT` might contain a string that gives an indication for which user ID the passphrase is required. If this is not available, or not applicable (in the case of symmetric encryption, for example), `UID_HINT` will be `NULL`.

The argument `PASSPHRASE_INFO`, if not `NULL`, will give further information about the context in which the passphrase is required. This information is engine and operation specific.

If this is the repeated attempt to get the passphrase, because previous attempts failed, then `PREV_WAS_BAD` is 1, otherwise it will be 0.

The user must write the passphrase, followed by a newline character, to the file descriptor `FD`. The function `gpgme_io_writen` should be used for the write operation. Note that if the user returns 0 to indicate success, the user must at least write a newline character before returning from the callback.

If an error occurs, return the corresponding `gpgme_error_t` value. You can use the error code `GPG_ERR_CANCELED` to abort the operation. Otherwise, return 0.

Note: The `passphrase_cb` only works with GnuPG 1.x and 2.1.x and not with the 2.0.x series. See `gpgme_set_pinentry_mode` for more details on 2.1.x usage.

-- Function: `void gpgme_set_passphrase_cb (gpgme_ctx_t CTX, gpgme_passphrase_cb_t PASSFUNC, void *HOOK_VALUE)`

The function `gpgme_set_passphrase_cb` sets the function that is used when a passphrase needs to be provided by the user to `PASSFUNC`. The function `PASSFUNC` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `HOOK_VALUE`. By default, no passphrase callback function is set.

Not all crypto engines require this callback to retrieve the passphrase. It is better if the engine retrieves the passphrase from a trusted agent (a daemon process), rather than having each user to implement their own passphrase query. Some engines do not

even support an external passphrase callback at all, in this case the error code GPG\_ERR\_NOT\_SUPPORTED is returned.

For GnuPG >= 2.1 the pinentry mode has to be set to GPGME\_PINENTRY\_MODE\_LOOPBACK to enable the passphrase callback. See `gpgme_set_pinentry_mode`.

The user can disable the use of a passphrase callback function by calling `gpgme_set_passphrase_cb` with `PASSFUNC` being `NULL`.

-- Function: `void gpgme_get_passphrase_cb (gpgme_ctx_t CTX, gpgme_passphrase_cb_t *PASSFUNC, void **HOOK_VALUE)`

The function `gpgme_get_passphrase_cb` returns the function that is used when a passphrase needs to be provided by the user in `*PASSFUNC`, and the first argument for this function in `*HOOK_VALUE`. If no passphrase callback is set, or `CTX` is not a valid pointer, `NULL` is returned in both variables.

`PASSFUNC` or `HOOK_VALUE` can be `NULL`. In this case, the corresponding value will not be returned.

File: `gpgme.info`, Node: Progress Meter Callback, Next: Status Message Callback, Prev: Passphrase Callback, Up: Context Attributes

#### 7.4.11 Progress Meter Callback

-----  
-- Data type: `void (*gpgme_progress_cb_t)(void *HOOK, const char *WHAT, int TYPE, int CURRENT, int TOTAL)`

The `gpgme_progress_cb_t` type is the type of functions usable as progress callback function.

The arguments are specific to the crypto engine. More information about the progress information returned from the GnuPG engine can be found in the GnuPG source code in the file `doc/DETAILS` in the section `PROGRESS`.

-- Function: `void gpgme_set_progress_cb (gpgme_ctx_t CTX, gpgme_progress_cb_t PROGFUNC, void *HOOK_VALUE)`

The function `gpgme_set_progress_cb` sets the function that is used when progress information about a cryptographic operation is available. The function `PROGFUNC` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `HOOK_VALUE`. By default, no progress callback function is set.

Setting a callback function allows an interactive program to

display progress information about a long operation to the user.

The user can disable the use of a progress callback function by calling `gpgme_set_progress_cb` with `PROG_FUNC` being `NULL`.

-- Function: `void gpgme_get_progress_cb (gpgme_ctx_t CTX, gpgme_progress_cb_t *PROG_FUNC, void **HOOK_VALUE)`

The function `gpgme_get_progress_cb` returns the function that is used to inform the user about the progress made in `*PROG_FUNC`, and the first argument for this function in `*HOOK_VALUE`. If no progress callback is set, or `CTX` is not a valid pointer, `NULL` is returned in both variables.

`PROG_FUNC` or `HOOK_VALUE` can be `NULL`. In this case, the corresponding value will not be returned.

File: `gpgme.info`, Node: Status Message Callback, Next: Context Flags, Prev: Progress Meter Callback, Up: Context Attributes

#### 7.4.12 Status Message Callback

-----

-- Data type: `gpgme_error_t (*gpgme_status_cb_t)(void *HOOK, const char *KEYWORD, const char *ARGS)`

The `gpgme_status_cb_t` type is the type of function usable as a status message callback function.

The argument `KEYWORD` is the name of the status message while the `ARGS` argument contains any arguments for the status message.

If an error occurs, return the corresponding `gpgme_error_t` value. Otherwise, return 0.

-- Function: `void gpgme_set_status_cb (gpgme_ctx_t CTX, gpgme_status_cb_t STATUS_FUNC, void *HOOK_VALUE)`

SINCE: 1.6.0

The function `gpgme_set_status_cb` sets the function that is used when a status message is received from `gpg` to `STATUS_FUNC`. The function `STATUS_FUNC` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `HOOK_VALUE`. By default, no status message callback function is set.

The user can disable the use of a status message callback function by calling `gpgme_set_status_cb` with `STATUS_FUNC` being `NULL`.

-- Function: void gpgme\_get\_status\_cb (gpgme\_ctx\_t CTX,  
gpgme\_status\_cb\_t \*STATUSFUNC, void \*\*HOOK\_VALUE)  
SINCE: 1.6.0

The function gpgme\_get\_status\_cb returns the function that is used to process status messages from gpg in \*STATUSFUNC, and the first argument for this function in \*HOOK\_VALUE. If no status message callback is set, or CTX is not a valid pointer, NULL is returned in both variables.

File: gpgme.info, Node: Context Flags, Next: Locale, Prev: Status Message Callback, Up: Context Attributes

### 7.4.13 Context Flags

-----  
-- Function: gpgme\_error\_t gpgme\_set\_ctx\_flag (gpgme\_ctx\_t CTX,  
const char \*NAME, const char \*VALUE)

SINCE: 1.7.0

Some minor properties of the context can be controlled with flags set by this function. The properties are identified by the following values for NAME:

"redraw"

This flag is normally not changed by the caller because GPGME sets and clears it automatically: The flag is cleared before an operation and set if an operation noticed that the engine has launched a Pinentry. A Curses based application may use this information to redraw the screen; for example:

```
err = gpgme_op_keylist_start (ctx, "foo@example.org", 0);
while (!err)
{
    err = gpgme_op_keylist_next (ctx, &key);
    if (err)
        break;
    show_key (key);
    gpgme_key_release (key);
}
if ((s = gpgme_get_ctx_flag (ctx, "redraw")) && *s)
    redraw_screen ();
gpgme_release (ctx);
```

"full-status"

Using a VALUE of "1" the status callback set by gpgme\_set\_status\_cb returns all status lines with the

exception of PROGRESS lines. With the default of "0" the status callback is only called in certain situations.

#### "raw-description"

Setting the VALUE to "1" returns human readable strings in a raw format. For example the non breaking space characters ("~") will not be removed from the description field of the `gpgme_tofu_info_t` object.

#### "export-session-key"

Using a VALUE of "1" specifies that the context should try to export the symmetric session key when decrypting data. By default, or when using an empty string or "0" for VALUE, session keys are not exported.

#### "override-session-key"

The string given in VALUE is passed to the GnuPG engine to override the session key for decryption. The format of that session key is specific to GnuPG and can be retrieved during a decrypt operation when the context flag "export-session-key" is enabled. Please be aware that using this feature with GnuPG < 2.1.16 will leak the session key on many platforms via `ps(1)`.

#### "auto-key-retrieve"

Setting the VALUE to "1" asks the backend to automatically retrieve a key for signature verification if possible. Note that this option makes a "web bug" like behavior possible. Keyserver or Web Key Directory operators can see which keys you request, so by sending you a message signed by a brand new key (which you naturally will not have on your local keyring), the operator can tell both your IP address and the time when you verified the signature.

#### "request-origin"

The string given in VALUE is passed to the GnuPG engines to request restrictions based on the origin of the request. Valid values are documented in the GnuPG manual and the `gpg` man page under the option `--request-origin`. Requires at least GnuPG 2.2.6 to have an effect.

#### "no-symkey-cache"

For OpenPGP disable the passphrase cache used for symmetrical en- and decryption. This cache is based on the message specific salt value. Requires at least GnuPG 2.2.7 to have an effect.

#### "ignore-mdc-error"

This flag passes the option `--ignore-mdc-error` to `gpg`. This can be used to force decryption of a message which failed due to a missing integrity check. This flag must be used with great caution and only if it is a known non-corrupted old message and the decryption result of the former try had the decryption result flag `legacy_cipher_nomdc` set. For failsafe reasons this flag is reset after each operation.

"auto-key-locate"

The string given in `VALUE` is passed to `gpg`. This can be used to change the behavior of a `GPGME_KEYLIST_MODE_LOCATE` keylisting. Valid values are documented in the GnuPG manual and the `gpg` man page under the option `--auto-key-locate`. Requires at least GnuPG 2.1.18.

Note: Keys retrieved through `auto-key-locate` are automatically imported in the keyring.

trust-model

SINCE: 1.11.2

Change the trust-model for all GnuPG engine operations. An empty string sets the trust-model back to the users default. If the trust-model is not supported by GnuPG the behavior is undefined and will likely cause all operations to fail. Example: "tofu+pgp".

This options should be used carefully with a strict version requirement. In some versions of GnuPG setting the trust-model changes the default trust-model for future operations. A change in the trust-model also can have unintended side effects, like rebuilding the trust-db.

This function returns 0 on success.

-- Function: `const char * gpgme_get_ctx_flag (gpgme_ctx_t CTX, const char *NAME)`

SINCE: 1.8.0

The value of flags settable by `gpgme_set_ctx_flag` can be retrieved by this function. If `NAME` is unknown the function returns `NULL`. For boolean flags an empty string is returned for False and the string "1" is returned for True; either `atoi(3)` or a test for an empty string can be used to get the boolean value.

File: `gpgme.info`, Node: `Locale`, Next: `Additional Logs`, Prev: `Context Flags`, Up: `Context Attributes`

#### 7.4.14 Locale

-----

A locale setting can be associated with a context. This locale is passed to the crypto engine, and used for applications like the PIN entry, which is displayed to the user when entering a passphrase is required.

The default locale is used to initialize the locale setting of all contexts created afterwards.

-- Function: `gpgme_error_t gpgme_set_locale (gpgme_ctx_t CTX, int CATEGORY, const char *VALUE)`  
SINCE: 0.4.3

The function `gpgme_set_locale` sets the locale of the context `CTX`, or the default locale if `CTX` is a null pointer.

The locale settings that should be changed are specified by `CATEGORY`. Supported categories are `LC_CTYPE`, `LC_MESSAGES`, and `LC_ALL`, which is a wildcard you can use if you want to change all the categories at once.

The value to be used for the locale setting is `VALUE`, which will be copied to GPGMEs internal data structures. `VALUE` can be a null pointer, which disables setting the locale, and will make PIN entry and other applications use their default setting, which is usually not what you want.

Note that the settings are only used if the application runs on a text terminal, and that the settings should fit the configuration of the output terminal. Normally, it is sufficient to initialize the default value at startup.

The function returns an error if not enough memory is available.

File: `gpgme.info`, Node: Additional Logs, Prev: Locale, Up: Context Attributes

#### 7.4.15 Additional Logs

-----

Additional logs can be associated with a context. These logs are engine specific and can be obtained with `gpgme_op_getauditlog`.

-- Function: `gpgme_error_t gpgme_op_getauditlog (gpgme_ctx_t CTX, gpgme_data_t OUTPUT, unsigned int FLAGS)`

SINCE: 1.1.1

The function `gpgme_op_getauditlog` is used to obtain additional logs as specified by `FLAGS` into the `OUTPUT` data. If

The function returns the error code `GPG_ERR_NO_ERROR` if a log could be queried from the engine, and `GPG_ERR_NOT_IMPLEMENTED` if the log specified in `FLAGS` is not available for this engine. If no log is available `GPG_ERR_NO_DATA` is returned.

The value in `FLAGS` is a bitwise-or combination of one or multiple of the following bit values:

#### `GPGME_AUDITLOG_DIAG`

SINCE: 1.11.2

Obtain diagnostic output which would be written to `stderr` in interactive use of the engine. This can be used to provide additional diagnostic information in case of errors in other operations.

Note: If log-file has been set in the configuration the log will be empty and `GPG_ERR_NO_DATA` will be returned.

Implemented for: `GPGME_PROTOCOL_OpenPGP`

#### `GPGME_AUDITLOG_DEFAULT`

SINCE: 1.11.2

This flag has the value 0 for compatibility reasons. Obtains additional information from the engine by issuing the `GETAUDITLOG` command. For `GPGME_PROTOCOL_CMS` this provides additional information about the X509 certificate chain.

Implemented for: `GPGME_PROTOCOL_CMS`

#### `GPGME_AUDITLOG_HTML`

SINCE: 1.1.1

Same as `GPGME_AUDITLOG_DEFAULT` but in HTML.

Implemented for: `GPGME_PROTOCOL_CMS`

-- Function: `gpgme_error_t gpgme_op_getauditlog_start (gpgme_ctx_t CTX, gpgme_data_t OUTPUT, unsigned int FLAGS)`

SINCE: 1.1.1

This is the asynchronous variant of `gpgme_op_getauditlog`.

## 7.5 Key Management

=====

Some of the cryptographic operations require that recipients or signers are specified. This is always done by specifying the respective keys that should be used for the operation. The following section describes how such keys can be selected and manipulated.

\* Menu:

- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.
- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
- \* Advanced Key Editing:: Advanced key edit operation.

File: gpgme.info, Node: Key objects, Next: Listing Keys, Up: Key Management

### 7.5.1 Key objects

-----

The keys are represented in GPGME by structures which may only be read by the application but never be allocated or changed. They are valid as long as the key object itself is valid.

-- Data type: gpgme\_key\_t

The gpgme\_key\_t type is a pointer to a key object. It has the following members:

gpgme\_keylist\_mode\_t keylist\_mode  
SINCE: 0.9.0

The keylist mode that was active when the key was retrieved.

unsigned int revoked : 1

This is true if the key is revoked.

unsigned int expired : 1

This is true if the key is expired.

unsigned int disabled : 1

This is true if the key is disabled.

unsigned int invalid : 1

This is true if the key is invalid. This might have several reasons, for a example for the S/MIME backend, it will be set during key listings if the key could not be validated due to missing certificates or unmatched policies.

unsigned int can\_encrypt : 1

This is true if the key (ie one of its subkeys) can be used for encryption.

unsigned int can\_sign : 1

This is true if the key (ie one of its subkeys) can be used to create data signatures.

unsigned int can\_certify : 1

This is true if the key (ie one of its subkeys) can be used to create key certificates.

unsigned int can\_authenticate : 1

SINCE: 0.4.5

This is true if the key (ie one of its subkeys) can be used for authentication.

unsigned int is\_qualified : 1

SINCE: 1.1.0

This is true if the key can be used for qualified signatures according to local government regulations.

unsigned int secret : 1

This is true if the key is a secret key. Note, that this will always be true even if the corresponding subkey flag may be false (offline/stub keys). This is only set if a listing of secret keys has been requested or if GPGME\_KEYLIST\_MODE\_WITH\_SECRET is active.

unsigned int origin : 5

SINCE: 1.8.0

Reserved for the origin of this key.

gpgme\_protocol\_t protocol

This is the protocol supported by this key.

char \*issuer\_serial

If protocol is GPGME\_PROTOCOL\_CMS, then this is the issuer serial.

char \*issuer\_name

If protocol is GPGME\_PROTOCOL\_CMS, then this is the issuer name.

char \*chain\_id

If protocol is GPGME\_PROTOCOL\_CMS, then this is the chain ID, which can be used to build the certificate chain.

gpgme\_validity\_t owner\_trust

If protocol is GPGME\_PROTOCOL\_OpenPGP, then this is the owner trust.

gpgme\_subkey\_t subkeys

This is a linked list with the subkeys of the key. The first subkey in the list is the primary key and usually available.

gpgme\_user\_id\_t uids

This is a linked list with the user IDs of the key. The first user ID in the list is the main (or primary) user ID.

char \*fpr

SINCE: 1.7.0

This field gives the fingerprint of the primary key. Note that this is a copy of the fingerprint of the first subkey. For an incomplete key (for example from a verification result) a subkey may be missing but this field may be set nevertheless.

unsigned long last\_update

SINCE: 1.8.0

Reserved for the time of the last update of this key.

-- Data type: gpgme\_subkey\_t

SINCE: 1.5.0

The gpgme\_subkey\_t type is a pointer to a subkey structure. Subkeys are one component of a gpgme\_key\_t object. In fact,

subkeys are those parts that contains the real information about the individual cryptographic keys that belong to the same key object. One `gpgme_key_t` can contain several subkeys. The first subkey in the linked list is also called the primary key.

The subkey structure has the following members:

`gpgme_subkey_t next`

This is a pointer to the next subkey structure in the linked list, or NULL if this is the last element.

`unsigned int revoked : 1`

This is true if the subkey is revoked.

`unsigned int expired : 1`

This is true if the subkey is expired.

`unsigned int disabled : 1`

This is true if the subkey is disabled.

`unsigned int invalid : 1`

This is true if the subkey is invalid.

`unsigned int can_encrypt : 1`

This is true if the subkey can be used for encryption.

`unsigned int can_sign : 1`

This is true if the subkey can be used to create data signatures.

`unsigned int can_certify : 1`

This is true if the subkey can be used to create key certificates.

`unsigned int can_authenticate : 1`

SINCE: 0.4.5

This is true if the subkey can be used for authentication.

`unsigned int is_qualified : 1`

SINCE: 1.1.0

This is true if the subkey can be used for qualified signatures according to local government regulations.

`unsigned int is_de_vs : 1`

SINCE: 1.8.0

This is true if the subkey complies with the rules for classified information in Germany at the restricted level (VS-NfD). This are currently RSA keys of at least 2048 bits or ECDH/ECDSA keys using a Brainpool curve.

unsigned int secret : 1

This is true if the subkey is a secret key. Note that it will be false if the key is actually a stub key; i.e. a secret key operation is currently not possible (offline-key). This is only set if a listing of secret keys has been requested or if GPGME\_KEYLIST\_MODE\_WITH\_SECRET is active.

gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm supported by this subkey.

unsigned int length

This is the length of the subkey (in bits).

char \*keyid

This is the key ID of the subkey in hexadecimal digits.

char \*fpr

This is the fingerprint of the subkey in hexadecimal digits, if available.

char \*keygrip

SINCE: 1.7.0

The keygrip of the subkey in hex digit form or NULL if not available.

long int timestamp

This is the creation timestamp of the subkey. This is -1 if the timestamp is invalid, and 0 if it is not available.

long int expires

This is the expiration timestamp of the subkey, or 0 if the subkey does not expire.

unsigned int is\_cardkey : 1

SINCE: 1.2.0

True if the secret key is stored on a smart card.

char \*card\_number

SINCE: 1.2.0

The serial number of a smart card holding this key or NULL.

char \*curve

For ECC algorithms the name of the curve.

-- Data type: gpgme\_user\_id\_t

A user ID is a component of a gpgme\_key\_t object. One key can have many user IDs. The first one in the list is the main (or primary) user ID.

The user ID structure has the following members.

gpgme\_user\_id\_t next

This is a pointer to the next user ID structure in the linked list, or NULL if this is the last element.

unsigned int revoked : 1

This is true if the user ID is revoked.

unsigned int invalid : 1

This is true if the user ID is invalid.

gpgme\_validity\_t validity

This specifies the validity of the user ID.

char \*uid

This is the user ID string.

char \*name

This is the name component of uid, if available.

char \*comment

This is the comment component of uid, if available.

char \*email

This is the email component of uid, if available.

char \*address;

The mail address (addr-spec from RFC-5322) of the user ID string. This is general the same as the email part of this structure but might be slightly different. If no mail address is available NULL is stored.

gpgme\_tofu\_info\_t tofu

SINCE: 1.7.0

If not NULL information from the TOFU database pertaining to this user id.

gpgme\_key\_sig\_t signatures

This is a linked list with the signatures on this user ID.

unsigned int origin : 5

SINCE: 1.8.0

Reserved for the origin of this user ID.

unsigned long last\_update

SINCE: 1.8.0

Reserved for the time of the last update of this user ID.

-- Data type: gpgme\_tofu\_info\_t

SINCE: 1.7.0

The gpgme\_tofu\_info\_t type is a pointer to a tofu info structure.

Tofu info structures are one component of a gpgme\_user\_id\_t object, and provide information from the TOFU database pertaining to the user ID.

The tofu info structure has the following members:

gpgme\_key\_sig\_t next

This is a pointer to the next tofu info structure in the linked list, or NULL if this is the last element.

unsigned int validity : 3

This is the TOFU validity. It can have the following values:

0

The value 0 indicates a conflict.

1

The value 1 indicates a key without history.

2

The value 2 indicates a key with too little history.

3

The value 3 indicates a key with enough history for basic trust.

4

The value 4 indicates a key with a lot of history.

unsigned int policy : 4

This is the TOFU policy, see `gpgme_tofu_policy_t`.

unsigned short signcount

This is the number of signatures seen for this binding (or `USHRT_MAX` if there are more than that).

unsigned short encrcount

This is the number of encryptions done with this binding (or `USHRT_MAX` if there are more than that).

unsigned long signfirst

Number of seconds since Epoch when the first signature was seen with this binding.

unsigned long signlast

Number of seconds since Epoch when the last signature was seen with this binding.

unsigned long encrfirst

Number of seconds since Epoch when the first encryption was done with this binding.

unsigned long enclast

Number of seconds since Epoch when the last encryption was done with this binding.

char \*description

A human-readable string summarizing the TOFU data (or NULL).

-- Data type: `gpgme_key_sig_t`

The `gpgme_key_sig_t` type is a pointer to a key signature structure. Key signatures are one component of a `gpgme_key_t` object, and validate user IDs on the key in the OpenPGP protocol.

The signatures on a key are only available if the key was retrieved via a listing operation with the `GPGME_KEYLIST_MODE_SIGS` mode enabled, because it can be expensive to retrieve all signatures of a key.

The signature notations on a key signature are only available if the key was retrieved via a listing operation with the `GPGME_KEYLIST_MODE_SIG_NOTATIONS` mode enabled, because it can be expensive to retrieve all signature notations.

The key signature structure has the following members:

gpgme\_key\_sig\_t next

This is a pointer to the next key signature structure in the linked list, or NULL if this is the last element.

unsigned int revoked : 1

This is true if the key signature is a revocation signature.

unsigned int expired : 1

This is true if the key signature is expired.

unsigned int invalid : 1

This is true if the key signature is invalid.

unsigned int exportable : 1

This is true if the key signature is exportable.

gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm used to create the signature.

char \*keyid

This is the key ID of the key (in hexadecimal digits) used to create the signature.

long int timestamp

This is the creation timestamp of the key signature. This is -1 if the timestamp is invalid, and 0 if it is not available.

long int expires

This is the expiration timestamp of the key signature, or 0 if the key signature does not expire.

gpgme\_error\_t status

This is the status of the signature and has the same meaning as the member of the same name in a gpgme\_signature\_t object.

unsigned int sig\_class

This specifies the signature class of the key signature. The meaning is specific to the crypto engine.

char \*uid

This is the main user ID of the key used to create the signature.

char \*name

This is the name component of uid, if available.

char \*comment

This is the comment component of uid, if available.

char \*email

This is the email component of uid, if available.

gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

File: gpgme.info, Node: Listing Keys, Next: Information About Keys, Prev: Key objects, Up: Key Management

### 7.5.2 Listing Keys

-----

-- Function: gpgme\_error\_t gpgme\_op\_keylist\_start (gpgme\_ctx\_t CTX,  
const char \*PATTERN, int SECRET\_ONLY)

The function gpgme\_op\_keylist\_start initiates a key listing operation inside the context CTX. It sets everything up so that subsequent invocations of gpgme\_op\_keylist\_next return the keys in the list.

If PATTERN is NULL, all available keys are returned. Otherwise, PATTERN contains an engine specific expression that is used to limit the list to all keys matching the pattern. Note that the total length of the pattern is restricted to an engine-specific maximum (a couple of hundred characters are usually accepted). The pattern should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If SECRET\_ONLY is not 0, the list is restricted to secret keys only.

The context will be busy until either all keys are received (and gpgme\_op\_keylist\_next returns GPG\_ERR\_EOF), or gpgme\_op\_keylist\_end is called to finish the operation.

The function returns the error code GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_keylist\_ext\_start (gpgme\_ctx\_t CTX,  
const char \*PATTERN[], int SECRET\_ONLY, int RESERVED)

The function gpgme\_op\_keylist\_ext\_start initiates an extended key listing operation inside the context CTX. It sets everything up so that subsequent invocations of gpgme\_op\_keylist\_next return the

keys in the list.

If PATTERN or \*PATTERN is NULL, all available keys are returned. Otherwise, PATTERN is a NULL terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim. Note that the total length of all patterns is restricted to an engine-specific maximum (the exact limit also depends on the number of patterns and amount of quoting required, but a couple of hundred characters are usually accepted). Patterns should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If SECRET\_ONLY is not 0, the list is restricted to secret keys only.

The value of RESERVED must be 0.

The context will be busy until either all keys are received (and gpgme\_op\_keylist\_next returns GPG\_ERR\_EOF), or gpgme\_op\_keylist\_end is called to finish the operation.

The function returns the error code GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_keylist_from_data_start  
            (gpgme_ctx_t CTX, gpgme_data_t DATA, int RESERVED)
```

SINCE: 1.8.0

The function gpgme\_op\_keylist\_from\_data\_start initiates a key listing operation inside the context CTX. In contrast to the other key listing operation the keys are read from the supplied DATA and not from the local key database. The keys are also not imported into the local key database. The function sets everything up so that subsequent invocations of gpgme\_op\_keylist\_next return the keys from DATA.

The value of RESERVED must be 0.

This function requires at least GnuPG version 2.1.14 and currently works only with OpenPGP keys.

The context will be busy until either all keys are received (and gpgme\_op\_keylist\_next returns GPG\_ERR\_EOF), or gpgme\_op\_keylist\_end is called to finish the operation. While the context is busy DATA may not be released.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_keylist_next (gpgme_ctx_t CTX,  
          gpgme_key_t *R_KEY)
```

The function `gpgme_op_keylist_next` returns the next key in the list created by a previous `gpgme_op_keylist_start` operation in the context `CTX`. The key will have one reference for the user.  
*\*Note Manipulating Keys:::*

This is the only way to get at `gpgme_key_t` objects in GPGME.

If the last key in the list has already been returned, `gpgme_op_keylist_next` returns `GPG_ERR_EOF`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` or `R_KEY` is not a valid pointer, and `GPG_ERR_ENOMEM` if there is not enough memory for the operation.

```
-- Function: gpgme_error_t gpgme_op_keylist_end (gpgme_ctx_t CTX)
```

The function `gpgme_op_keylist_end` ends a pending key list operation in the context `CTX`.

After the operation completed successfully, the result of the key listing operation can be retrieved with `gpgme_op_keylist_result`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

The following example illustrates how all keys containing a certain string (`g10code`) can be listed with their key ID and the name and email address of the main user ID:

```
gpgme_ctx_t ctx;  
gpgme_key_t key;  
gpgme_error_t err = gpgme_new (&ctx);  
  
if (!err)  
{  
    err = gpgme_op_keylist_start (ctx, "g10code", 0);  
    while (!err)  
    {  
        err = gpgme_op_keylist_next (ctx, &key);
```

```

    if (err)
        break;
    printf ("%s:", key->subkeys->keyid);
    if (key->uids && key->uids->name)
        printf (" %s", key->uids->name);
    if (key->uids && key->uids->email)
        printf (" <%s>", key->uids->email);
    putchar ('\n');
    gpgme_key_release (key);
}
gpgme_release (ctx);
}
if (gpg_err_code (err) != GPG_ERR_EOF)
{
    fprintf (stderr, "can not list keys: %s\n", gpgme_strerror (err));
    exit (1);
}

```

-- Data type: `gpgme_keylist_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_keylist_*` operation. After successfully ending a key listing operation, you can retrieve the pointer to the result with `gpgme_op_keylist_result`. The structure contains the following member:

`unsigned int truncated : 1`

This is true if the crypto backend had to truncate the result, and less than the desired keys could be listed.

-- Function: `gpgme_keylist_result_t gpgme_op_keylist_result (gpgme_ctx_t CTX)`

The function `gpgme_op_keylist_result` returns a `gpgme_keylist_result_t` pointer to a structure holding the result of a `gpgme_op_keylist_*` operation. The pointer is only valid if the last operation on the context was a key listing operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

In a simple program, for which a blocking operation is acceptable, the following function can be used to retrieve a single key.

-- Function: `gpgme_error_t gpgme_get_key (gpgme_ctx_t CTX, const char *FPR, gpgme_key_t *R_KEY, int SECRET)`

The function `gpgme_get_key` gets the key with the fingerprint (or key ID) FPR from the crypto backend and return it in R\_KEY. If SECRET is true, get the secret key. The currently active keylist mode is used to retrieve the key. The key will have one reference for the user.

If the key is not found in the keyring, `gpgme_get_key` returns the error code `GPG_ERR_EOF` and `*R_KEY` will be set to `NULL`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` or `R_KEY` is not a valid pointer or `FPR` is not a fingerprint or key ID, `GPG_ERR_AMBIGUOUS_NAME` if the key ID was not a unique specifier for a key, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

File: `gpgme.info`, Node: Information About Keys, Next: Manipulating Keys, Prev: Listing Keys, Up: Key Management

### 7.5.3 Information About Keys

-----

Please see the beginning of this section for more information about `gpgme_key_t` objects.

-- Data type: `gpgme_validity_t`

The `gpgme_validity_t` type is used to specify the validity of a user ID in a key. The following validities are defined:

#### `GPGME_VALIDITY_UNKNOWN`

The user ID is of unknown validity. The string representation of this validity is `?`.

#### `GPGME_VALIDITY_UNDEFINED`

The validity of the user ID is undefined. The string representation of this validity is `q`.

#### `GPGME_VALIDITY_NEVER`

The user ID is never valid. The string representation of this validity is `n`.

#### `GPGME_VALIDITY_MARGINAL`

The user ID is marginally valid. The string representation of this validity is `m`.

#### `GPGME_VALIDITY_FULL`

The user ID is fully valid. The string representation of this validity is `f`.

#### `GPGME_VALIDITY_ULTIMATE`

The user ID is ultimately valid. The string representation of this validity is `u`.

File: gpgme.info, Node: Manipulating Keys, Next: Generating Keys, Prev: Information About Keys, Up: Key Management

#### 7.5.4 Manipulating Keys

-----

- Function: void gpgme\_key\_ref (gpgme\_key\_t KEY)  
The function gpgme\_key\_ref acquires an additional reference for the key KEY.
- Function: void gpgme\_key\_unref (gpgme\_key\_t KEY)  
The function gpgme\_key\_unref releases a reference for the key KEY. If this was the last reference, the key will be destroyed and all resources associated to it will be released.

File: gpgme.info, Node: Generating Keys, Next: Signing Keys, Prev: Manipulating Keys, Up: Key Management

#### 7.5.5 Generating Keys

-----

GPGME provides a set of functions to create public key pairs. Most of these functions require the use of GnuPG 2.1 and later; for older GnuPG versions the gpgme\_op\_genkey function can be used. Existing code which wants to update to the new functions or new code which shall supports older GnuPG versions may try the new functions first and provide a fallback to the old function if the error code GPG\_ERR\_NOT\_SUPPORTED is received.

- Function: gpgme\_error\_t gpgme\_op\_createkey (gpgme\_ctx\_t CTX, const char \*USERID, const char \*ALGO, unsigned long RESERVED, unsigned long EXPIRES, gpgme\_key\_t EXTRAKEY, unsigned int FLAGS);

SINCE: 1.7.0

The function gpgme\_op\_createkey generates a new key for the protocol active in the context CTX. As of now this function does only work for OpenPGP and requires at least version 2.1.13 of GnuPG.

USERID is commonly the mail address associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

ALGO specifies the algorithm for the new key (actually a keypair of public and private key). For a list of supported algorithms, see the GnuPG manual. If ALGO is NULL or the string "default", the key is generated using the default algorithm of the engine. If the string "future-default" is used the engine may use an algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms. For the OpenPGP protocol, the specification of a default algorithm, without requesting a non-default usage via FLAGS, triggers the creation of a primary key plus a secondary key (subkey).

RESERVED must be set to zero.

EXPIRES specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag GPGME\_CREATE\_NOEXPIRE to create keys that do not expire. Note that this parameter takes an unsigned long value and not a time\_t to avoid problems on systems which use a signed 32 bit time\_t. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

EXTRAKEY is currently not used and must be set to NULL. A future version of GPGME may use this parameter to create X.509 keys.

FLAGS can be set to the bit-wise OR of the following flags:

GPGME\_CREATE\_SIGN  
GPGME\_CREATE\_ENCR  
GPGME\_CREATE\_CERT  
GPGME\_CREATE\_AUTH

SINCE: 1.7.0

Do not create the key with the default capabilities (key usage) of the requested algorithm but use those explicitly given by these flags: signing, encryption, certification, or authentication. The allowed combinations depend on the algorithm.

If any of these flags are set and a default algorithm has been selected only one key is created in the case of the OpenPGP protocol.

GPGME\_CREATE\_NOPASSWD

SINCE: 1.7.0

Request generation of the key without password protection.

#### GPGME\_CREATE\_SELFSIGNED

SINCE: 1.7.0

For an X.509 key do not create a CSR but a self-signed certificate. This has not yet been implemented.

#### GPGME\_CREATE\_NOSTORE

SINCE: 1.7.0

Do not store the created key in the local key database. This has not yet been implemented.

#### GPGME\_CREATE\_WANTPUB

#### GPGME\_CREATE\_WANTSEC

SINCE: 1.7.0

Return the public or secret key as part of the result structure. This has not yet been implemented.

#### GPGME\_CREATE\_FORCE

SINCE: 1.7.0

The engine does not allow the creation of a key with a user ID already existing in the local key database. This flag can be used to override this check.

#### GPGME\_CREATE\_NOEXPIRE

SINCE: 1.8.0

Request generation of keys that do not expire.

After the operation completed successfully, information about the created key can be retrieved with `gpgme_op_genkey_result`.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_createkey_start (gpgme_ctx_t CTX,  
    const char *USERID, const char *ALGO, unsigned long RESERVED,  
    unsigned long EXPIRES, gpgme_key_t EXTRAKEY,  
    unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_createkey_start` initiates a `gpgme_op_createkey` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting

For Completion::

```
-- Function: gpgme_error_t gpgme_op_createsubkey (gpgme_ctx_t CTX,  
          gpgme_key_t KEY, const char *ALGO, unsigned long RESERVED,  
          unsigned long EXPIRES, unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_createsubkey` creates and adds a new subkey to the primary OpenPGP key given by `KEY`. The only allowed protocol in `CTX` is `GPGME_PROTOCOL_OPENPGP`. Subkeys (aka secondary keys) are a concept in the OpenPGP protocol to bind several keys to a primary key. As of now this function requires at least version 2.1.13 of GnuPG.

`KEY` specifies the key to operate on.

`ALGO` specifies the algorithm for the new subkey. For a list of supported algorithms, see the GnuPG manual. If `ALGO` is `NULL` or the string "default", the subkey is generated using the default algorithm for an encryption subkey of the engine. If the string "future-default" is used the engine may use an encryption algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms.

`RESERVED` must be set to zero.

`EXPIRES` specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag `GPGME_CREATE_NOEXPIRE` to create keys that do not expire. Note that this parameter takes an unsigned long value and not a `time_t` to avoid problems on systems which use a signed 32 bit `time_t`. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

`FLAGS` takes the same values as described above for `gpgme_op_createkey`.

After the operation completed successfully, information about the created key can be retrieved with `gpgme_op_genkey_result`.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_createsubkey_start  
          (gpgme_ctx_t CTX, gpgme_key_t KEY, const char *ALGO,
```

unsigned long RESERVED, unsigned long EXPIRES,  
unsigned int FLAGS);

SINCE: 1.7.0

The function `gpgme_op_createsubkey_start` initiates a `gpgme_op_createsubkey` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

-- Function: `gpgme_error_t gpgme_op_adduid (gpgme_ctx_t CTX,  
gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);`

SINCE: 1.7.0

The function `gpgme_op_adduid` adds a new user ID to the OpenPGP key given by `KEY`. Adding additional user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `CTX` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`KEY` specifies the key to operate on.

`USERID` is the user ID to add to the key. A user ID is commonly the mail address to be associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

`FLAGS` are currently not used and must be set to zero.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

-- Function: `gpgme_error_t gpgme_op_adduid_start (gpgme_ctx_t CTX,  
gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);`

SINCE: 1.7.0

The function `gpgme_op_adduid_start` initiates a `gpgme_op_adduid` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

-- Function: `gpgme_error_t gpgme_op_revuid (gpgme_ctx_t CTX,  
gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);`

SINCE: 1.7.0

The function `gpgme_op_revuid` revokes a user ID from the OpenPGP key given by `KEY`. Revoking user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `CTX` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`KEY` specifies the key to operate on.

`USERID` is the user ID to be revoked from the key. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `uid` field from the user ID object (`gpgme_user_id_t`) is to be used. This is a required parameter.

`FLAGS` are currently not used and must be set to zero.

Note that the engine wont allow to revoke the last valid user ID. To change a user ID is better to first add the new user ID, then revoke the old one, and finally publish the key.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_revuid_start (gpgme_ctx_t CTX,  
        gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_revuid_start` initiates a `gpgme_op_revuid` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

```
-- Function: gpgme_error_t gpgme_op_set_ui_flag (gpgme_ctx_t CTX,  
        gpgme_key_t KEY, const char *USERID, cons char * NAME,  
        cons char * VALUE);
```

SINCE: 1.8.0

The function `gpgme_op_set_uid_flag` is used to set flags on a user ID from the OpenPGP key given by `KEY`. Setting flags on user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `CTX` must be set to OpenPGP.

`KEY` specifies the key to operate on. This parameters is required.

`USERID` is the user ID of the key to be manipulated. This user ID

must be given verbatim because the engine does an exact and case sensitive match. Thus the uid field from the user ID object (gpgme\_user\_id\_t) is to be used. This is a required parameter.

NAME names the flag which is to be changed. The only currently supported flag is:

primary

This sets the primary key flag on the given user ID. All other primary key flag on other user IDs are removed. VALUE must be given as NULL. For technical reasons this functions bumps the creation timestamp of all affected self-signatures up by one second. At least GnuPG version 2.1.20 is required.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_set_uid_flag_start
(gpgme_ctx_t CTX, gpgme_key_t KEY, const char *USERID,
 cons char * NAME, cons char * VALUE);
```

SINCE: 1.8.0

The function gpgme\_op\_set\_uid\_flag\_start initiates a gpgme\_op\_set\_uid\_flag operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

```
-- Function: gpgme_error_t gpgme_op_genkey (gpgme_ctx_t CTX,
const char *PARMS, gpgme_data_t PUBLIC, gpgme_data_t SECRET)
```

The function gpgme\_op\_genkey generates a new key pair in the context CTX. The meaning of PUBLIC and SECRET depends on the crypto backend.

GPG does not support PUBLIC and SECRET, they should be NULL. GnuPG will generate a key pair and add it to the standard key ring. The fingerprint of the generated key is available with gpgme\_op\_genkey\_result.

GpgSM requires PUBLIC to be a writable data object. GpgSM will generate a secret key (which will be stored by gpg-agent, and return a certificate request in PUBLIC, which then needs to be signed by the certification authority and imported before it can be used. GpgSM does not make the fingerprint available.

The argument PARMS specifies parameters for the key in an string

that looks something like XML. The details about the format of PARMS are specific to the crypto engine used by CTX. The first line of the parameters must be `<GnupgKeyParams format="internal">` and the last line must be `</GnupgKeyParams>`. Every line in between the first and last lines is treated as a Header: Value pair. In particular, no XML escaping is necessary if you need to include the characters `<`, `>`, or `&`.

Here is an example for GnuPG as the crypto engine (all parameters of OpenPGP key generation are documented in the GPG manual):

```
<GnupgKeyParams format="internal">
Key-Type: default
Subkey-Type: default
Name-Real: Joe Tester
Name-Comment: with stupid passphrase
Name-Email: joe@foo.bar
Expire-Date: 0
Passphrase: abc
</GnupgKeyParams>
```

Here is an example for GpgSM as the crypto engine (all parameters of OpenPGP key generation are documented in the GPGSM manual):

```
<GnupgKeyParams format="internal">
Key-Type: RSA
Key-Length: 1024
Name-DN: C=de,O=g10 code,OU=Testlab,CN=Joe 2 Tester
Name-Email: joe@foo.bar
</GnupgKeyParams>
```

Strings should be given in UTF-8 encoding. The only format supported for now is internal. The content of the GnupgKeyParams container is passed verbatim to the crypto backend. Control statements are not allowed.

After the operation completed successfully, the result can be retrieved with `gpgme_op_genkey_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if PARMS is not a well-formed string (e.g. does not have the expected tag-like headers and footers), `GPG_ERR_NOT_SUPPORTED` if PUBLIC or SECRET is not valid, and `GPG_ERR_GENERAL` if no key was created by the backend.

```
-- Function: gpgme_error_t gpgme_op_genkey_start (gpgme_ctx_t CTX,
const char *PARMS, gpgme_data_t PUBLIC, gpgme_data_t SECRET)
```

The function `gpgme_op_genkey_start` initiates a `gpgme_op_genkey` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `PARMS` is not a valid XML string, and `GPG_ERR_NOT_SUPPORTED` if `PUBLIC` or `SECRET` is not `NULL`.

-- Data type: `gpgme_genkey_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_genkey` operation. After successfully generating a key, you can retrieve the pointer to the result with `gpgme_op_genkey_result`. The structure contains the following members:

unsigned int primary : 1

This flag is set to 1 if a primary key was created and to 0 if not.

unsigned int sub : 1

This flag is set to 1 if a subkey was created and to 0 if not.

unsigned int uid : 1

This flag is set to 1 if a user ID was created and to 0 if not.

char \*fpr

This is the fingerprint of the key that was created. If both a primary and a subkey were generated, the fingerprint of the primary key will be returned. If the crypto engine does not provide the fingerprint, `fpr` will be a null pointer.

`gpgme_data_t` pubkey

SINCE: 1.7.0

This will eventually be used to return the public key. It is currently not used.

`gpgme_data_t` seckey

SINCE: 1.7.0

This will eventually be used to return the secret key. It is currently not used.

-- Function: `gpgme_genkey_result_t gpgme_op_genkey_result`

(gpgme\_ctx\_t CTX)

The function `gpgme_op_genkey_result` returns a `gpgme_genkey_result_t` pointer to a structure holding the result of a `gpgme_op_genkey` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_genkey` or `gpgme_op_genkey_start` operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

File: `gpgme.info`, Node: Signing Keys, Next: Exporting Keys, Prev: Generating Keys, Up: Key Management

### 7.5.6 Signing Keys

-----

Key signatures are a unique concept of the OpenPGP protocol. They can be used to certify the validity of a key and are used to create the Web-of-Trust (WoT). Instead of using the `gpgme_op_interact` function along with a finite state machine, GPGME provides a convenient function to create key signatures when using modern GnuPG versions.

```
-- Function: gpgme_error_t gpgme_op_keysign (gpgme_ctx_t CTX,  
      gpgme_key_t KEY, const char *USERID, unsigned long EXPIRES,  
      unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_keysign` adds a new key signature to the public key `KEY`. This function requires at least version 2.1.12 of GnuPG.

`CTX` is the usual context which describes the protocol to use (which must be OpenPGP) and has also the list of signer keys to be used for the signature. The common case is to use the default key for signing other keys. If another key or more than one key shall be used for a key signature, `gpgme_signers_add` can be used. \*Note `Selecting Signers::`.

`KEY` specifies the key to operate on.

`USERID` selects the user ID or user IDs to be signed. If `USERID` is set to `NULL` all valid user IDs are signed. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `uid` field from the user ID object (`gpgme_user_id_t`) is to be used. To select more than one user ID put them all into one string separated by linefeeds characters (`\n`) and set the flag `GPGME_KEYSIGN_LFSEP`.

EXPIRES specifies the expiration time of the new signature in seconds. The common case is to use 0 to not set an expiration date. However, if the configuration of the engine defines a default expiration for key signatures, that is still used unless the flag GPGME\_KEYSIGN\_NOEXPIRE is used. Note that this parameter takes an unsigned long value and not a time\_t to avoid problems on systems which use a signed 32 bit time\_t. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

FLAGS can be set to the bit-wise OR of the following flags:

#### GPGME\_KEYSIGN\_LOCAL

SINCE: 1.7.0

Instead of creating an exportable key signature, create a key signature which is marked as non-exportable.

#### GPGME\_KEYSIGN\_LFSEP

SINCE: 1.7.0

Although linefeeds are uncommon in user IDs this flag is required to explicitly declare that USERID may contain several linefeed separated user IDs.

#### GPGME\_KEYSIGN\_NOEXPIRE

Force the creation of a key signature without an expiration date. This overrides EXPIRE and any local configuration of the engine.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_keysign_start (gpgme_ctx_t CTX,  
    gpgme_key_t KEY, const char *USERID, unsigned long EXPIRES,  
    unsigned int FLAGS);
```

SINCE: 1.7.0

The function gpgme\_op\_keysign\_start initiates a gpgme\_op\_keysign operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

File: gpgme.info, Node: Exporting Keys, Next: Importing Keys, Prev: Signing Keys, Up: Key Management

## 7.5.7 Exporting Keys

-----

Exporting keys means the same as running gpg with the command `--export`. However, a mode flag can be used to change the way the export works. The available mode flags are described below, they may be or-ed together.

### GPGME\_EXPORT\_MODE\_EXTERN

If this bit is set, the output is send directly to the default keyserver. This is currently only allowed for OpenPGP keys. It is good practise to not send more than a few dozens key to a keyserver at one time. Using this flag requires that the `KEYDATA` argument of the export function is set to `NULL`.

### GPGME\_EXPORT\_MODE\_MINIMAL

SINCE: 1.3.1

If this bit is set, the smallest possible key is exported. For OpenPGP keys it removes all signatures except for the latest self-signatures. For X.509 keys it has no effect.

### GPGME\_EXPORT\_MODE\_SECRET

SINCE: 1.6.0

Instead of exporting the public key, the secret key is exported. This may not be combined with `GPGME_EXPORT_MODE_EXTERN`. For X.509 the export format is PKCS#8.

### GPGME\_EXPORT\_MODE\_RAW

SINCE: 1.6.0

If this flag is used with `GPGME_EXPORT_MODE_SECRET` for an X.509 key the export format will be changed to PKCS#1. This flag may not be used with OpenPGP.

### GPGME\_EXPORT\_MODE\_PKCS12

SINCE: 1.6.0

If this flag is used with `GPGME_EXPORT_MODE_SECRET` for an X.509 key the export format will be changed to PKCS#12 which also includes the certificate. This flag may not be used with OpenPGP.

### GPGME\_EXPORT\_MODE\_NOUID

SINCE: 1.12.0 - experimental Do not export user ids. Works only with certain gpg version.

-- Function: `gpgme_error_t gpgme_op_export (gpgme_ctx_t CTX,  
const char *PATTERN, gpgme_export_mode_t MODE,  
gpgme_data_t KEYDATA)`

The function `gpgme_op_export` extracts public keys and returns them in the data buffer `KEYDATA`. The output format of the key data returned is determined by the ASCII armor attribute set for the context `CTX`, or, if that is not set, by the encoding specified for `KEYDATA`.

If `PATTERN` is `NULL`, all available keys are returned. Otherwise, `PATTERN` contains an engine specific expression that is used to limit the list to all keys matching the pattern.

`MODE` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation completed successfully, `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_export_start (gpgme_ctx_t CTX,  
const char *PATTERN, gpgme_export_mode_t MODE,  
gpgme_data_t KEYDATA)`

The function `gpgme_op_export_start` initiates a `gpgme_op_export` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer.

-- Function: `gpgme_error_t gpgme_op_export_ext (gpgme_ctx_t CTX,  
const char *PATTERN[], gpgme_export_mode_t MODE,  
gpgme_data_t KEYDATA)`

The function `gpgme_op_export_ext` extracts public keys and returns them in the data buffer `KEYDATA`. The output format of the key data returned is determined by the ASCII armor attribute set for the context `CTX`, or, if that is not set, by the encoding specified for `KEYDATA`.

If `PATTERN` or `*PATTERN` is `NULL`, all available keys are returned. Otherwise, `PATTERN` is a `NULL` terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim.

`MODE` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the

operation completed successfully, GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_export\_ext\_start (gpgme\_ctx\_t CTX,  
const char \*PATTERN[], gpgme\_export\_mode\_t MODE,  
gpgme\_data\_t KEYDATA)

The function gpgme\_op\_export\_ext\_start initiates a gpgme\_op\_export\_ext operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer.

-- Function: gpgme\_error\_t gpgme\_op\_export\_keys (gpgme\_ctx\_t CTX,  
gpgme\_key\_t keys[], gpgme\_export\_mode\_t MODE,  
gpgme\_data\_t KEYDATA)

SINCE: 1.2.0

The function gpgme\_op\_export\_keys extracts public keys and returns them in the data buffer KEYDATA. The output format of the key data returned is determined by the ASCII armor attribute set for the context CTX, or, if that is not set, by the encoding specified for KEYDATA.

The keys to export are taken from the NULL terminated array KEYS. Only keys of the currently selected protocol of CTX which do have a fingerprint set are considered for export. Other keys specified by the KEYS are ignored. In particular OpenPGP keys retrieved via an external key listing are not included.

MODE is usually 0; other values are described above.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation completed successfully, GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer, GPG\_ERR\_NO\_DATA if no useful keys are in KEYS and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_export\_keys\_start (gpgme\_ctx\_t CTX,  
gpgme\_key\_t KEYS[], gpgme\_export\_mode\_t MODE,  
gpgme\_data\_t KEYDATA)

SINCE: 1.2.0

The function gpgme\_op\_export\_keys\_start initiates a gpgme\_op\_export\_ext operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `KEYS` and passes through any errors that are reported by the crypto engine support routines.

File: `gpgme.info`, Node: Importing Keys, Next: Deleting Keys, Prev: Exporting Keys, Up: Key Management

### 7.5.8 Importing Keys

-----

Importing keys means the same as running `gpg` with the command `--import`.

-- Function: `gpgme_error_t gpgme_op_import (gpgme_ctx_t CTX, gpgme_data_t KEYDATA)`

The function `gpgme_op_import` adds the keys in the data buffer `KEYDATA` to the key ring of the crypto engine used by `CTX`. The format of `KEYDATA` can be ASCII armored, for example, but the details are specific to the crypto engine.

After the operation completed successfully, the result can be retrieved with `gpgme_op_import_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `KEYDATA` if `CTX` or `KEYDATA` is not a valid pointer, and `GPG_ERR_NO_DATA` if `KEYDATA` is an empty data buffer.

-- Function: `gpgme_error_t gpgme_op_import_start (gpgme_ctx_t CTX, gpgme_data_t KEYDATA)`

The function `gpgme_op_import_start` initiates a `gpgme_op_import` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the import could be started successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEYDATA` is not a valid pointer, and `GPG_ERR_NO_DATA` if `KEYDATA` is an empty data buffer.

-- Function: `gpgme_error_t gpgme_op_import_keys (gpgme_ctx_t CTX, gpgme_key_t *KEYS)`

SINCE: 1.2.0

The function `gpgme_op_import_keys` adds the keys described by the NULL terminated array `KEYS` to the key ring of the crypto engine

used by CTX. It is used to actually import and make keys permanent which have been retrieved from an external source (i.e. using GPGME\_KEYLIST\_MODE\_EXTERN) earlier. The external keylisting must have been made with the same context configuration (in particular the same home directory). (1) Note that for OpenPGP this may require another access to the keyserver over the network.

Only keys of the currently selected protocol of CTX are considered for import. Other keys specified by the KEYS are ignored. As of now all considered keys must have been retrieved using the same method, i.e. the used key listing mode must be identical.

After the operation completed successfully, the result can be retrieved with `gpgme_op_import_result`.

To move keys from one home directory to another, export and import the keydata using `gpgme_op_export` and `gpgme_op_import`.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if CTX is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

-- Function: `gpgme_error_t gpgme_op_import_keys_start (gpgme_ctx_t CTX, gpgme_key_t *KEYS)`  
SINCE: 1.2.0

The function `gpgme_op_import_keys_start` initiates a `gpgme_op_import_keys` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if KEYDATA if CTX or KEYDATA is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

-- Data type: `gpgme_import_status_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_import` operation. For each considered key one status is added that contains information about the result of the import. The structure contains the following members:

`gpgme_import_status_t next`

This is a pointer to the next status structure in the linked list, or NULL if this is the last element.

char \*fpr

This is the fingerprint of the key that was considered.

gpgme\_error\_t result

If the import was not successful, this is the error value that caused the import to fail. Otherwise the error code is GPG\_ERR\_NO\_ERROR.

unsigned int status

This is a bit-wise OR of the following flags that give more information about what part of the key was imported. If the key was already known, this might be 0.

GPGME\_IMPORT\_NEW

The key was new.

GPGME\_IMPORT\_UID

The key contained new user IDs.

GPGME\_IMPORT\_SIG

The key contained new signatures.

GPGME\_IMPORT\_SUBKEY

The key contained new sub keys.

GPGME\_IMPORT\_SECRET

The key contained a secret key.

-- Data type: gpgme\_import\_result\_t

This is a pointer to a structure used to store the result of a gpgme\_op\_import operation. After a successful import operation, you can retrieve the pointer to the result with gpgme\_op\_import\_result. The structure contains the following members:

int considered

The total number of considered keys.

int no\_user\_id

The number of keys without user ID.

int imported

The total number of imported keys.

int imported\_rsa

The number of imported RSA keys.

int unchanged

The number of unchanged keys.

int new\_user\_ids

The number of new user IDs.

int new\_sub\_keys

The number of new sub keys.

int new\_signatures

The number of new signatures.

int new\_revocations

The number of new revocations.

int secret\_read

The total number of secret keys read.

int secret\_imported

The number of imported secret keys.

int secret\_unchanged

The number of unchanged secret keys.

int not\_imported

The number of keys not imported.

gpgme\_import\_status\_t imports

A list of gpgme\_import\_status\_t objects which contain more information about the keys for which an import was attempted.

int skipped\_v3\_keys

For security reasons modern versions of GnuPG do not anymore support v3 keys (created with PGP 2.x) and ignores them on import. This counter provides the number of such skipped v3 keys.

-- Function: gpgme\_import\_result\_t gpgme\_op\_import\_result  
(gpgme\_ctx\_t CTX)

The function gpgme\_op\_import\_result returns a gpgme\_import\_result\_t pointer to a structure holding the result of a gpgme\_op\_import operation. The pointer is only valid if the last operation on the context was a gpgme\_op\_import or gpgme\_op\_import\_start operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

----- Footnotes -----

(1) Thus it is a replacement for the usual workaround of exporting and then importing a key to make an X.509 key permanent.

File: gpgme.info, Node: Deleting Keys, Next: Changing Passphrases, Prev: Importing Keys, Up: Key Management

### 7.5.9 Deleting Keys

-----

-- Function: `gpgme_error_t gpgme_op_delete_ext (gpgme_ctx_t CTX, const gpgme_key_t KEY, unsigned int FLAGS)`  
SINCE: 1.9.1

The function `gpgme_op_delete_ext` deletes the key `KEY` from the key ring of the crypto engine used by `CTX`.

`FLAGS` can be set to the bit-wise OR of the following flags:

`GPGME_DELETE_ALLOW_SECRET`  
SINCE: 1.9.1

If not set, only public keys are deleted. If set, secret keys are deleted as well, if that is supported.

`GPGME_DELETE_FORCE`  
SINCE: 1.9.1

If set, the user is not asked to confirm the deletion.

The function returns the error code `GPG_ERR_NO_ERROR` if the key was deleted successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer, `GPG_ERR_NO_PUBKEY` if `KEY` could not be found in the keyring, `GPG_ERR_AMBIGUOUS_NAME` if the key was not specified unambiguously, and `GPG_ERR_CONFLICT` if the secret key for `KEY` is available, but `ALLOW_SECRET` is zero.

-- Function: `gpgme_error_t gpgme_op_delete_ext_start (gpgme_ctx_t CTX, const gpgme_key_t KEY, unsigned int FLAGS)`  
SINCE: 1.9.1

The function `gpgme_op_delete_ext_start` initiates a `gpgme_op_delete` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

The following functions allow only to use one particular flag.

-- Function: `gpgme_error_t gpgme_op_delete (gpgme_ctx_t CTX,  
const gpgme_key_t KEY, int ALLOW_SECRET)`

Similar to `gpgme_op_delete_ext`, but only the flag  
`GPGME_DELETE_ALLOW_SECRET` can be provided.

-- Function: `gpgme_error_t gpgme_op_delete_start (gpgme_ctx_t CTX,  
const gpgme_key_t KEY, int ALLOW_SECRET)`

Similar to `gpgme_op_delete_ext_start`, but only the flag  
`GPGME_DELETE_ALLOW_SECRET` can be provided.

File: `gpgme.info`, Node: Changing Passphrases, Next: Changing TOFU Data, Prev: Deleting Keys, Up: Key Management

### 7.5.10 Changing Passphrases

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-- Function: `gpgme_error_t gpgme_op_passwd (gpgme_ctx_t CTX,  
const gpgme_key_t KEY, unsigned int FLAGS)`

SINCE: 1.3.0

The function `gpgme_op_passwd` changes the passphrase of the private key associated with `KEY`. The only allowed value for `FLAGS` is 0. The backend engine will usually popup a window to ask for the old and the new passphrase. Thus this function is not useful in a server application (where passphrases are not required anyway).

Note that old gpg engines (before version 2.0.15) do not support this command and will silently ignore it.

-- Function: `gpgme_error_t gpgme_op_passwd_start (gpgme_ctx_t CTX,  
const gpgme_key_t KEY, unsigned int FLAGS)`

SINCE: 1.3.0

The function `gpgme_op_passwd_start` initiates a `gpgme_op_passwd` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns 0 if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

### 7.5.11 Changing TOFU Data

-----

The OpenPGP engine features a Trust-On-First-Use (TOFU) key validation model. For resolving conflicts it is necessary to declare the policy for a key. See the GnuPG manual for details on the TOFU implementation.

-- Data type: enum gpgme\_tofu\_policy\_t  
SINCE: 1.7.0

The gpgme\_tofu\_policy\_t type specifies the set of possible policy values that are supported by GPGME:

GPGME\_TOFU\_POLICY\_AUTO

Set the policy to auto.

GPGME\_TOFU\_POLICY\_GOOD

Set the policy to good.

GPGME\_TOFU\_POLICY\_BAD

Set the policy to bad.

GPGME\_TOFU\_POLICY\_ASK

Set the policy to ask.

GPGME\_TOFU\_POLICY\_UNKNOWN

Set the policy to unknown.

To change the policy for a key the following functions can be used:

-- Function: gpgme\_error\_t gpgme\_op\_tofu\_policy (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, gpgme\_tofu\_policy\_t POLICY)

SINCE: 1.7.0

The function gpgme\_op\_tofu\_policy changes the TOFU policy of KEY. The valid values for POLICY are listed above. As of now this function does only work for OpenPGP and requires at least version 2.1.10 of GnuPG.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

-- Function: gpgme\_error\_t gpgme\_op\_tofu\_policy\_start (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, gpgme\_tofu\_policy\_t POLICY)

SINCE: 1.7.0

The function `gpgme_op_tofu_policy_start` initiates a `gpgme_op_tofu_policy` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns 0 if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

File: `gpgme.info`, Node: Advanced Key Editing, Prev: Changing TOFU Data, Up: Key Management

### 7.5.12 Advanced Key Editing

-----  
-- Data type: `gpgme_error_t (*gpgme_interact_cb_t) (void *HANDLE, const char *STATUS, const char *ARGS, int FD)`

SINCE: 1.7.0

The `gpgme_interact_cb_t` type is the type of functions which GPGME calls if it a key interact operation is on-going. The status keyword `STATUS` and the argument line `ARGS` are passed through by GPGME from the crypto engine. An empty string represents EOF. The file descriptor `FD` is -1 for normal status messages. If `STATUS` indicates a command rather than a status message, the response to the command should be written to `FD`. The `HANDLE` is provided by the user at start of operation.

The function should return `GPG_ERR_FALSE` if it did not handle the status code, 0 for success, or any other error value.

-- Function: `gpgme_error_t gpgme_op_interact (gpgme_ctx_t CTX, gpgme_key_t KEY, unsigned int FLAGS, gpgme_interact_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

SINCE: 1.7.0

The function `gpgme_op_interact` processes the key `KEY` interactively, using the interact callback function `FNC` with the handle `HANDLE`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `OUT`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by GPGME.

FLAGS modifies the behaviour of the function; the only defined bit value is:

#### GPGME\_INTERACT\_CARD

SINCE: 1.7.0

This is used for smartcard based keys and uses gpgs --card-edit command.

The function returns 0 if the edit operation completes successfully, GPG\_ERR\_INV\_VALUE if CTX or KEY is not a valid pointer, and any error returned by the crypto engine or the edit callback handler.

-- Function: gpgme\_error\_t gpgme\_op\_interact\_start (gpgme\_ctx\_t CTX, gpgme\_key\_t KEY, unsigned int FLAGS, gpgme\_interact\_cb\_t FNC, void \*HANDLE, gpgme\_data\_t OUT)

SINCE: 1.7.0

The function gpgme\_op\_interact\_start initiates a gpgme\_op\_interact operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns 0 if the operation was started successfully, and GPG\_ERR\_INV\_VALUE if CTX or KEY is not a valid pointer.

File: gpgme.info, Node: Trust Item Management, Next: Crypto Operations, Prev: Key Management, Up: Contexts

### 7.6 Trust Item Management

=====

\*Caution:\* The trust items interface is experimental.

-- Data type: gpgme\_trust\_item\_t

The gpgme\_trust\_item\_t type is a pointer to a trust item object.

It has the following members:

char \*keyid

This is a string describing the key to which this trust items belongs.

int type

This is the type of the trust item. A value of 1 refers to a key, a value of 2 refers to a user ID.

int level

This is the trust level.

char \*owner\_trust

The owner trust if type is 1.

char \*validity

The calculated validity.

char \*name

The user name if type is 2.

\* Menu:

\* Listing Trust Items:: Browsing the list of available trust items.

\* Manipulating Trust Items:: Operations on trust items.

File: gpgme.info, Node: Listing Trust Items, Next: Manipulating Trust Items, Up: Trust Item Management

### 7.6.1 Listing Trust Items

-----

-- Function: gpgme\_error\_t gpgme\_op\_trustlist\_start (gpgme\_ctx\_t CTX,  
const char \*PATTERN, int MAX\_LEVEL)

The function gpgme\_op\_trustlist\_start initiates a trust item listing operation inside the context CTX. It sets everything up so that subsequent invocations of gpgme\_op\_trustlist\_next return the trust items in the list.

The string PATTERN contains an engine specific expression that is used to limit the list to all trust items matching the pattern. It can not be the empty string.

The argument MAX\_LEVEL is currently ignored.

The context will be busy until either all trust items are received (and gpgme\_op\_trustlist\_next returns GPG\_ERR\_EOF), or gpgme\_op\_trustlist\_end is called to finish the operation.

The function returns the error code GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_trustlist\_next (gpgme\_ctx\_t CTX,  
gpgme\_trust\_item\_t \*R\_ITEM)

The function gpgme\_op\_trustlist\_next returns the next trust item in the list created by a previous gpgme\_op\_trustlist\_start operation in the context CTX. The trust item can be destroyed with

gpgme\_trust\_item\_release. \*Note Manipulating Trust Items::.

This is the only way to get at gpgme\_trust\_item\_t objects in GPGME.

If the last trust item in the list has already been returned, gpgme\_op\_trustlist\_next returns GPG\_ERR\_EOF.

The function returns the error code GPG\_ERR\_INV\_VALUE if CTX or R\_ITEM is not a valid pointer, and GPG\_ERR\_ENOMEM if there is not enough memory for the operation.

-- Function: gpgme\_error\_t gpgme\_op\_trustlist\_end (gpgme\_ctx\_t CTX)

The function gpgme\_op\_trustlist\_end ends a pending trust list operation in the context CTX.

The function returns the error code GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, and GPG\_ERR\_ENOMEM if at some time during the operation there was not enough memory available.

File: gpgme.info, Node: Manipulating Trust Items, Prev: Listing Trust Items, Up: Trust Item Management

## 7.6.2 Manipulating Trust Items

-----  
-- Function: void gpgme\_trust\_item\_ref (gpgme\_trust\_item\_t ITEM)

The function gpgme\_trust\_item\_ref acquires an additional reference for the trust item ITEM.

-- Function: void gpgme\_trust\_item\_unref (gpgme\_trust\_item\_t ITEM)

The function gpgme\_trust\_item\_unref releases a reference for the trust item ITEM. If this was the last reference, the trust item will be destroyed and all resources associated to it will be released.

File: gpgme.info, Node: Crypto Operations, Next: Miscellaneous, Prev: Trust Item Management, Up: Contexts

## 7.7 Crypto Operations

=====  
Sometimes, the result of a crypto operation returns a list of invalid keys encountered in processing the request. The following structure is used to hold information about such a key.

-- Data type: gpgme\_invalid\_key\_t

This is a pointer to a structure used to store a part of the result

of a crypto operation which takes user IDs as one input parameter.

The structure contains the following members:

`gpgme_invalid_key_t next`

This is a pointer to the next invalid key structure in the linked list, or NULL if this is the last element.

`char *fpr`

The fingerprint or key ID of the invalid key encountered.

`gpgme_error_t reason`

An error code describing the reason why the key was found invalid.

\* Menu:

- \* Decrypt::                Decrypting a ciphertext.
- \* Verify::                Verifying a signature.
- \* Decrypt and Verify::    Decrypting a signed ciphertext.
- \* Sign::                  Creating a signature.
- \* Encrypt::                Encrypting a plaintext.

File: `gpgme.info`, Node: Decrypt, Next: Verify, Up: Crypto Operations

### 7.7.1 Decrypt

-----

-- Function: `gpgme_error_t gpgme_op_decrypt (gpgme_ctx_t CTX, gpgme_data_t CIPHER, gpgme_data_t PLAIN)`

The function `gpgme_op_decrypt` decrypts the ciphertext in the data object CIPHER and stores it into the data object PLAIN.

The function returns the error code `GPG_ERR_NO_ERROR` if the ciphertext could be decrypted successfully, `GPG_ERR_INV_VALUE` if CTX, CIPHER or PLAIN is not a valid pointer, `GPG_ERR_NO_DATA` if CIPHER does not contain any data to decrypt, `GPG_ERR_DECRYPT_FAILED` if CIPHER is not a valid cipher text, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, and passes through some errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_decrypt_start (gpgme_ctx_t CTX, gpgme_data_t CIPHER, gpgme_data_t PLAIN)`

The function `gpgme_op_decrypt_start` initiates a `gpgme_op_decrypt` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if CIPHER or PLAIN is not a valid pointer.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_ext ( gpgme\_ctx\_t CTX,  
gpgme\_decrypt\_flags\_t FLAGS, gpgme\_data\_t CIPHER,  
gpgme\_data\_t PLAIN)

SINCE: 1.8.0

The function gpgme\_op\_decrypt\_ext is the same as gpgme\_op\_decrypt but has an additional argument FLAGS. If FLAGS is 0 both function behave identically.

The value in FLAGS is a bitwise-or combination of one or multiple of the following bit values:

GPGME\_DECRYPT\_VERIFY

SINCE: 1.8.0

The GPGME\_DECRYPT\_VERIFY symbol specifies that this function shall exactly act as gpgme\_op\_decrypt\_verify.

GPGME\_DECRYPT\_UNWRAP

SINCE: 1.8.0

The GPGME\_DECRYPT\_UNWRAP symbol specifies that the output shall be an OpenPGP message with only the encryption layer removed. This requires GnuPG 2.1.12 and works only for OpenPGP. This is the counterpart to GPGME\_ENCRYPT\_WRAP.

The function returns the error codes as described for gpgme\_op\_decrypt respective gpgme\_op\_encrypt.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_ext\_start ( gpgme\_ctx\_t CTX, gpgme\_decrypt\_flags\_t FLAGS,  
gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

SINCE: 1.8.0

The function gpgme\_op\_decrypt\_ext\_start initiates a gpgme\_op\_decrypt\_ext operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if CIPHER or PLAIN is not a valid pointer.

-- Data type: `gpgme_recipient_t`

SINCE: 1.1.0

This is a pointer to a structure used to store information about the recipient of an encrypted text which is decrypted in a `gpgme_op_decrypt` operation. This information (except for the status field) is even available before the operation finished successfully, for example in a passphrase callback. The structure contains the following members:

`gpgme_recipient_t next`

This is a pointer to the next recipient structure in the linked list, or NULL if this is the last element.

`gpgme_pubkey_algo_t`

The public key algorithm used in the encryption.

`char *keyid`

This is the key ID of the key (in hexadecimal digits) used as recipient.

`gpgme_error_t status`

This is an error number with the error code `GPG_ERR_NO_SECKEY` if the secret key for this recipient is not available, and 0 otherwise.

-- Data type: `gpgme_decrypt_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_decrypt` operation. After successfully decrypting data, you can retrieve the pointer to the result with `gpgme_op_decrypt_result`. As with all result structures, it this structure shall be considered read-only and an application must not allocate such a structure on its own. The structure contains the following members:

`char *unsupported_algorithm`

If an unsupported algorithm was encountered, this string describes the algorithm that is not supported.

`unsigned int wrong_key_usage : 1`

SINCE: 0.9.0 This is true if the key was not used according to its policy.

`unsigned int legacy_cipher_nomdc : 1`

SINCE: 1.11.2 The message was made by a legacy algorithm without any integrity protection. This might be an old but legitimate message.

unsigned int is\_mime : 1;

SINCE: 1.11.0 The message claims that the content is a MIME object.

unsigned int is\_de\_vs : 1;

SINCE: 1.10.0 The message was encrypted in a VS-NfD compliant way. This is a specification in Germany for a restricted communication level.

gpgme\_recipient\_t recipients

SINCE: 1.1.0

This is a linked list of recipients to which this message was encrypted.

char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer.

char \*session\_key

SINCE: 1.8.0

A textual representation (nul-terminated string) of the session key used in symmetric encryption of the message, if the context has been set to export session keys (see `gpgme_set_ctx_flag`, "export-session-key"), and a session key was available for the most recent decryption operation. Otherwise, this is a null pointer.

You must not try to access this member of the struct unless `gpgme_set_ctx_flag` (ctx, "export-session-key") returns success or `gpgme_get_ctx_flag` (ctx, "export-session-key") returns true (non-empty string).

char \*symkey\_algo

SINCE: 1.11.0

A string with the symmetric encryption algorithm and mode using the format "<algo>.<mode>". Note that the deprecated non-MDC encryption mode of OpenPGP is given as "PGPCFB".

-- Function: `gpgme_decrypt_result_t gpgme_op_decrypt_result`  
(`gpgme_ctx_t` CTX)

The function `gpgme_op_decrypt_result` returns a `gpgme_decrypt_result_t` pointer to a structure holding the result of a `gpgme_op_decrypt` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_decrypt` or `gpgme_op_decrypt_start` operation. If the operation failed this

might be a NULL pointer. The returned pointer is only valid until the next operation is started on the context.

File: gpgme.info, Node: Verify, Next: Decrypt and Verify, Prev: Decrypt, Up: Crypto Operations

## 7.7.2 Verify

-----

-- Function: `gpgme_error_t gpgme_op_verify (gpgme_ctx_t CTX, gpgme_data_t SIG, gpgme_data_t SIGNED_TEXT, gpgme_data_t PLAIN)`

The function `gpgme_op_verify` verifies that the signature in the data object `SIG` is a valid signature. If `SIG` is a detached signature, then the signed text should be provided in `SIGNED_TEXT` and `PLAIN` should be a null pointer. Otherwise, if `SIG` is a normal (or cleartext) signature, `SIGNED_TEXT` should be a null pointer and `PLAIN` should be a writable data object that will contain the plaintext after successful verification.

The results of the individual signature verifications can be retrieved with `gpgme_op_verify_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be completed successfully, `GPG_ERR_INV_VALUE` if `CTX`, `SIG` or `PLAIN` is not a valid pointer, `GPG_ERR_NO_DATA` if `SIG` does not contain any data to verify, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_verify_start (gpgme_ctx_t CTX, gpgme_data_t SIG, gpgme_data_t SIGNED_TEXT, gpgme_data_t PLAIN)`

The function `gpgme_op_verify_start` initiates a `gpgme_op_verify` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `CTX`, `SIG` or `PLAIN` is not a valid pointer, and `GPG_ERR_NO_DATA` if `SIG` or `PLAIN` does not contain any data to verify.

-- Data type: `gpgme_sig_notation_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

`gpgme_sig_notation_t next`

This is a pointer to the next new signature notation structure

in the linked list, or NULL if this is the last element.

char \*name

The name of the notation field. If this is NULL, then the member value will contain a policy URL.

int name\_len

The length of the name field. For strings the length is counted without the trailing binary zero.

char \*value

The value of the notation field. If name is NULL, then this is a policy URL.

int value\_len

The length of the value field. For strings the length is counted without the trailing binary zero.

gpgme\_sig\_notation\_flags\_t flags

The accumulated flags field. This field contains the flags associated with the notation data in an accumulated form which can be used as an argument to the function `gpgme_sig_notation_add`. The value flags is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_SIG_NOTATION_HUMAN_READABLE`

SINCE: 1.1.0

The `GPGME_SIG_NOTATION_HUMAN_READABLE` symbol specifies that the notation data is in human readable form

`GPGME_SIG_NOTATION_CRITICAL`

SINCE: 1.1.0

The `GPGME_SIG_NOTATION_CRITICAL` symbol specifies that the notation data is critical.

unsigned int human\_readable : 1

This is true if the `GPGME_SIG_NOTATION_HUMAN_READABLE` flag is set and false otherwise. This flag is only valid for notation data, not for policy URLs.

unsigned int critical : 1

This is true if the `GPGME_SIG_NOTATION_CRITICAL` flag is set and false otherwise. This flag is valid for notation data and policy URLs.

-- Data type: `gpgme_signature_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

`gpgme_signature_t next`

This is a pointer to the next new signature structure in the linked list, or `NULL` if this is the last element.

`gpgme_sigsum_t summary`

This is a bit vector giving a summary of the signature status. It provides an easy interface to a defined semantic of the signature status. Checking just one bit is sufficient to see whether a signature is valid without any restrictions. This means that you can check for `GPGME_SIGSUM_VALID` like this:

```
if ((sig.summary & GPGME_SIGSUM_VALID))
{
    ..do stuff if valid..
}
else
{
    ..do stuff if not fully valid..
}
```

The defined bits are:

`GPGME_SIGSUM_VALID`

The signature is fully valid.

`GPGME_SIGSUM_GREEN`

The signature is good but one might want to display some extra information. Check the other bits.

`GPGME_SIGSUM_RED`

The signature is bad. It might be useful to check other bits and display more information, i.e. a revoked certificate might not render a signature invalid when the message was received prior to the cause for the revocation.

`GPGME_SIGSUM_KEY_REVOKED`

The key or at least one certificate has been revoked.

`GPGME_SIGSUM_KEY_EXPIRED`

The key or one of the certificates has expired. It is probably a good idea to display the date of the expiration.

`GPGME_SIGSUM_SIG_EXPIRED`

The signature has expired.

#### GPGME\_SIGSUM\_KEY\_MISSING

Cant verify due to a missing key or certificate.

#### GPGME\_SIGSUM\_CRL\_MISSING

The CRL (or an equivalent mechanism) is not available.

#### GPGME\_SIGSUM\_CRL\_TOO\_OLD

Available CRL is too old.

#### GPGME\_SIGSUM\_BAD\_POLICY

A policy requirement was not met.

#### GPGME\_SIGSUM\_SYS\_ERROR

A system error occurred.

#### GPGME\_SIGSUM\_TOFU\_CONFLICT

A TOFU conflict was detected.

char \*fpr

This is the fingerprint or key ID of the signature.

gpgme\_error\_t status

This is the status of the signature. In particular, the following status codes are of interest:

#### GPG\_ERR\_NO\_ERROR

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

#### GPG\_ERR\_SIG\_EXPIRED

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

#### GPG\_ERR\_KEY\_EXPIRED

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

#### GPG\_ERR\_CERT\_REVOKED

This status indicates that the signature is valid but the key used to verify the signature has been revoked. For the combined result this status means that all signatures are valid and all keys are revoked.

#### GPG\_ERR\_BAD\_SIGNATURE

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

#### GPG\_ERR\_NO\_PUBKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

#### GPG\_ERR\_GENERAL

This status indicates that there was some other error which prevented the signature verification.

#### gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

#### unsigned long timestamp

The creation timestamp of this signature.

#### unsigned long exp\_timestamp

The expiration timestamp of this signature, or 0 if the signature does not expire.

#### unsigned int wrong\_key\_usage : 1

This is true if the key was not used according to its policy.

#### unsigned int pka\_trust : 2

This is set to the trust information gained by means of the PKA system. Values are:

0

No PKA information available or verification not possible.

1

PKA verification failed.

2

PKA verification succeeded.

3

Reserved for future use.

Depending on the configuration of the engine, this metric may also be reflected by the validity of the signature.

#### unsigned int chain\_model : 1

SINCE: 1.1.6

This is true if the validity of the signature has been checked

using the chain model. In the chain model the time the signature has been created must be within the validity period of the certificate and the time the certificate itself has been created must be within the validity period of the issuing certificate. In contrast the default validation model checks the validity of signature as well at the entire certificate chain at the current time.

`gpgme_validity_t` validity

The validity of the signature.

`gpgme_error_t` validity\_reason

If a signature is not valid, this provides a reason why.

`gpgme_pubkey_algo_t`

The public key algorithm used to create this signature.

`gpgme_hash_algo_t`

The hash algorithm used to create this signature.

`char *pka_address`

The mailbox from the PKA information or NULL.

`gpgme_key_t` key

SINCE: 1.7.0

An object describing the key used to create the signature.

This key object may be incomplete in that it only conveys information available directly with a signature. It may also be NULL if such information is not readily available.

-- Data type: `gpgme_verify_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_verify` operation. After verifying a signature, you can retrieve the pointer to the result with `gpgme_op_verify_result`. If the operation failed this might be a NULL pointer. The structure contains the following member:

`gpgme_signature_t` signatures

A linked list with information about all signatures for which a verification was attempted.

`char *file_name`

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer. Warning: The filename is not covered by the signature.

`unsigned int is_mime : 1;`

SINCE: 1.11.0

The message claims that the content is a MIME object.

Warning: This flag is not covered by the signature.

-- Function: `gpgme_verify_result_t gpgme_op_verify_result`  
(`gpgme_ctx_t` CTX)

The function `gpgme_op_verify_result` returns a `gpgme_verify_result_t` pointer to a structure holding the result of a `gpgme_op_verify` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_verify`, `gpgme_op_verify_start`, `gpgme_op_decrypt_verify` or `gpgme_op_decrypt_verify_start` operation, and if this operation finished successfully (for `gpgme_op_decrypt_verify` and `gpgme_op_decrypt_verify_start`, the error code `GPG_ERR_NO_DATA` counts as successful in this context). The returned pointer is only valid until the next operation is started on the context.

File: `gpgme.info`, Node: Decrypt and Verify, Next: Sign, Prev: Verify, Up: Crypto Operations

### 7.7.3 Decrypt and Verify

-----

-- Function: `gpgme_error_t gpgme_op_decrypt_verify` (`gpgme_ctx_t` CTX,  
`gpgme_data_t` CIPHER, `gpgme_data_t` PLAIN)

The function `gpgme_op_decrypt_verify` decrypts the ciphertext in the data object CIPHER and stores it into the data object PLAIN. If CIPHER contains signatures, they will be verified.

After the operation completed, `gpgme_op_decrypt_result` and `gpgme_op_verify_result` can be used to retrieve more information about the signatures.

If the error code `GPG_ERR_NO_DATA` is returned, CIPHER does not contain any data to decrypt. However, it might still be signed.

The information about detected signatures is available with `gpgme_op_verify_result` in this case.

The function returns the error code `GPG_ERR_NO_ERROR` if the ciphertext could be decrypted successfully, `GPG_ERR_INV_VALUE` if CTX, CIPHER or PLAIN is not a valid pointer, `GPG_ERR_NO_DATA` if CIPHER does not contain any data to decrypt, `GPG_ERR_DECRYPT_FAILED` if CIPHER is not a valid cipher text, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_decrypt_verify_start`  
(`gpgme_ctx_t CTX`, `gpgme_data_t CIPHER`, `gpgme_data_t PLAIN`)  
The function `gpgme_op_decrypt_verify_start` initiates a  
`gpgme_op_decrypt_verify` operation. It can be completed by  
calling `gpgme_wait` on the context. \*Note Waiting For  
Completion:::

The function returns the error code `GPG_ERR_NO_ERROR` if the  
operation could be started successfully, `GPG_ERR_INV_VALUE` if  
`CTX`, `CIPHER`, `PLAIN` or `R_STAT` is not a valid pointer, and  
`GPG_ERR_NO_DATA` if `CIPHER` does not contain any data to decrypt.

When processing mails it is sometimes useful to extract the actual  
mail address (the `addr-spec`) from a string. GPGME provides this  
helper function which uses the same semantics as the internal functions  
in GPGME and GnuPG:

-- Function: `char * gpgme_addrspec_from_uid` (`const char *UID`)

SINCE: 1.7.1

Return the mail address (called `addr-spec` in RFC-5322) from the  
string `UID` which is assumed to be a user id (called `address` in  
RFC-5322). All plain ASCII characters (i.e. those with bit 7  
cleared) in the result are converted to lowercase. Caller must  
free the result using `gpgme_free`. Returns `NULL` if no valid  
address was found (in which case `ERRNO` is set to `EINVAL`) or for  
other errors.

File: `gpgme.info`, Node: Sign, Next: Encrypt, Prev: Decrypt and Verify, Up: Crypto Operations

#### 7.7.4 Sign

-----

A signature can contain signatures by one or more keys. The set of keys  
used to create a signatures is contained in a context, and is applied to  
all following signing operations in this context (until the set is  
changed).

\* Menu:

- \* Selecting Signers::       How to choose the keys to sign with.
- \* Creating a Signature::    How to create a signature.
- \* Signature Notation Data:: How to add notation data to a signature.

File: `gpgme.info`, Node: Selecting Signers, Next: Creating a Signature, Up: Sign

#### 7.7.4.1 Selecting Signers

.....

The key or the keys used to create a signature are stored in the context. The following functions can be used to manipulate this list. If no signer has been set into the context a default key is used for signing.

-- Function: void gpgme\_signers\_clear (gpgme\_ctx\_t CTX)

The function gpgme\_signers\_clear releases a reference for each key on the signers list and removes the list of signers from the context CTX.

Every context starts with an empty list.

-- Function: gpgme\_error\_t gpgme\_signers\_add (gpgme\_ctx\_t CTX, const gpgme\_key\_t KEY)

The function gpgme\_signers\_add adds the key KEY to the list of signers in the context CTX.

Calling this function acquires an additional reference for the key.

-- Function: unsigned int gpgme\_signers\_count (const gpgme\_ctx\_t CTX)  
SINCE: 1.4.3

The function gpgme\_signers\_count returns the number of signer keys in the context CTX.

-- Function: gpgme\_key\_t gpgme\_signers\_enum (const gpgme\_ctx\_t CTX, int SEQ)

The function gpgme\_signers\_enum returns the SEQth key in the list of signers in the context CTX. An additional reference is acquired for the user.

If SEQ is out of range, NULL is returned.

File: gpgme.info, Node: Creating a Signature, Next: Signature Notation Data, Prev: Selecting Signers, Up: Sign

#### 7.7.4.2 Creating a Signature

.....

-- Data type: enum gpgme\_sig\_mode\_t

The gpgme\_sig\_mode\_t type is used to specify the desired type of a signature. The following modes are available:

GPGME\_SIG\_MODE\_NORMAL

A normal signature is made, the output includes the plaintext and the signature.

#### GPGME\_SIG\_MODE\_DETACH

A detached signature is made.

#### GPGME\_SIG\_MODE\_CLEAR

A clear text signature is made. The ASCII armor and text mode settings of the context are ignored.

-- Function: `gpgme_error_t gpgme_op_sign (gpgme_ctx_t CTX, gpgme_data_t PLAIN, gpgme_data_t SIG, gpgme_sig_mode_t MODE)`

The function `gpgme_op_sign` creates a signature for the text in the data object `PLAIN` and returns it in the data object `SIG`. The type of the signature created is determined by the ASCII armor (or, if that is not set, by the encoding specified for `SIG`), the text mode attributes set for the context `CTX` and the requested signature mode `MODE`.

After the operation completed successfully, the result can be retrieved with `gpgme_op_sign_result`.

If an S/MIME signed message is created using the CMS crypto engine, the number of certificates to include in the message can be specified with `gpgme_set_include_certs`. \*Note Included Certificates::.

The function returns the error code `GPG_ERR_NO_ERROR` if the signature could be created successfully, `GPG_ERR_INV_VALUE` if `CTX`, `PLAIN` or `SIG` is not a valid pointer, `GPG_ERR_NO_DATA` if the signature could not be created, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, `GPG_ERR_UNUSABLE_SECKEY` if there are invalid signers, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_sign_start (gpgme_ctx_t CTX, gpgme_data_t PLAIN, gpgme_data_t SIG, gpgme_sig_mode_t MODE)`

The function `gpgme_op_sign_start` initiates a `gpgme_op_sign` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `CTX`, `PLAIN` or `SIG` is not a valid pointer.

-- Data type: `gpgme_new_signature_t`

This is a pointer to a structure used to store a part of the result

of a `gpgme_op_sign` operation. The structure contains the following members:

`gpgme_new_signature_t next`

This is a pointer to the next new signature structure in the linked list, or NULL if this is the last element.

`gpgme_sig_mode_t type`

The type of this signature.

`gpgme_pubkey_algo_t pubkey_algo`

The public key algorithm used to create this signature.

`gpgme_hash_algo_t hash_algo`

The hash algorithm used to create this signature.

`unsigned int sig_class`

The signature class of this signature.

`long int timestamp`

The creation timestamp of this signature.

`char *fpr`

The fingerprint of the key which was used to create this signature.

-- Data type: `gpgme_sign_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_sign` operation. After successfully generating a signature, you can retrieve the pointer to the result with `gpgme_op_sign_result`. The structure contains the following members:

`gpgme_invalid_key_t invalid_signers`

A linked list with information about all invalid keys for which a signature could not be created.

`gpgme_new_signature_t signatures`

A linked list with information about all signatures created.

-- Function: `gpgme_sign_result_t gpgme_op_sign_result (gpgme_ctx_t CTX)`

The function `gpgme_op_sign_result` returns a `gpgme_sign_result_t` pointer to a structure holding the result of a `gpgme_op_sign` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_sign`, `gpgme_op_sign_start`, `gpgme_op_encrypt_sign` or `gpgme_op_encrypt_sign_start` operation. If that operation failed, the function might return a NULL pointer. The returned pointer is only valid until the next

operation is started on the context.

File: gpgme.info, Node: Signature Notation Data, Prev: Creating a Signature, Up: Sign

### 7.7.4.3 Signature Notation Data

.....

Using the following functions, you can attach arbitrary notation data to a signature. This information is then available to the user when the signature is verified.

-- Function: void gpgme\_sig\_notation\_clear (gpgme\_ctx\_t CTX)  
SINCE: 1.1.0

The function gpgme\_sig\_notation\_clear removes the notation data from the context CTX. Subsequent signing operations from this context will not include any notation data.

Every context starts with an empty notation data list.

-- Function: gpgme\_error\_t gpgme\_sig\_notation\_add (gpgme\_ctx\_t CTX,  
const char \*NAME, const char \*VALUE,  
gpgme\_sig\_notation\_flags\_t FLAGS)  
SINCE: 1.1.0

The function gpgme\_sig\_notation\_add adds the notation data with the name NAME and the value VALUE to the context CTX.

Subsequent signing operations will include this notation data, as well as any other notation data that was added since the creation of the context or the last gpgme\_sig\_notation\_clear operation.

The arguments NAME and VALUE must be NUL-terminated strings in human-readable form. The flag GPGME\_SIG\_NOTATION\_HUMAN\_READABLE is implied (non-human-readable notation data is currently not supported). The strings must be in UTF-8 encoding.

If NAME is NULL, then VALUE should be a policy URL.

The function gpgme\_sig\_notation\_add returns the error code GPG\_ERR\_NO\_ERROR if the notation data could be added successfully, GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, or if NAME, VALUE and FLAGS are an invalid combination. The function also passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_sig\_notation\_t gpgme\_sig\_notation\_get

(const gpgme\_ctx\_t CTX)

SINCE: 1.1.0

The function `gpgme_sig_notation_get` returns the linked list of notation data structures that are contained in the context `CTX`.

If `CTX` is not a valid pointer, or there is no notation data added for this context, `NULL` is returned.

File: `gpgme.info`, Node: Encrypt, Prev: Sign, Up: Crypto Operations

### 7.7.5 Encrypt

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One plaintext can be encrypted for several recipients at the same time. The list of recipients is created independently of any context, and then passed to the encryption operation.

\* Menu:

\* Encrypting a Plaintext::     How to encrypt a plaintext.

File: `gpgme.info`, Node: Encrypting a Plaintext, Up: Encrypt

#### 7.7.5.1 Encrypting a Plaintext

.....

-- Function: `gpgme_error_t gpgme_op_encrypt (gpgme_ctx_t CTX, gpgme_key_t RECP[], gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN, gpgme_data_t CIPHER)`

The function `gpgme_op_encrypt` encrypts the plaintext in the data object `PLAIN` for the recipients `RECP` and stores the ciphertext in the data object `CIPHER`. The type of the ciphertext created is determined by the ASCII armor (or, if that is not set, by the encoding specified for `CIPHER`) and the text mode attributes set for the context `CTX`.

`RECP` must be a `NULL`-terminated array of keys. The user must keep references for all keys during the whole duration of the call (but see `gpgme_op_encrypt_start` for the requirements with the asynchronous variant).

The value in `FLAGS` is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_ENCRYPT_ALWAYS_TRUST`

The GPGME\_ENCRYPT\_ALWAYS\_TRUST symbol specifies that all the recipients in RECP should be trusted, even if the keys do not have a high enough validity in the keyring. This flag should be used with care; in general it is not a good idea to use any untrusted keys.

GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO  
SINCE: 1.2.0

The GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO symbol specifies that no default or hidden default recipients as configured in the crypto backend should be included. This can be useful for managing different user profiles.

GPGME\_ENCRYPT\_NO\_COMPRESS  
SINCE: 1.5.0

The GPGME\_ENCRYPT\_NO\_COMPRESS symbol specifies that the plaintext shall not be compressed before it is encrypted. This is in some cases useful if the length of the encrypted message may reveal information about the plaintext.

GPGME\_ENCRYPT\_PREPARE  
GPGME\_ENCRYPT\_EXPECT\_SIGN

The GPGME\_ENCRYPT\_PREPARE symbol is used with the UI Server protocol to prepare an encryption (i.e. sending the PREP\_ENCRYPT command). With the GPGME\_ENCRYPT\_EXPECT\_SIGN symbol the UI Server is advised to also expect a sign command.

GPGME\_ENCRYPT\_SYMMETRIC  
SINCE: 1.7.0

The GPGME\_ENCRYPT\_SYMMETRIC symbol specifies that the output should be additionally encrypted symmetrically even if recipients are provided. This feature is only supported for the OpenPGP crypto engine.

GPGME\_ENCRYPT\_THROW\_KEYIDS  
SINCE: 1.8.0

The GPGME\_ENCRYPT\_THROW\_KEYIDS symbols requests that the identifiers for the decryption keys are not included in the ciphertext. On the receiving side, the use of this flag may slow down the decryption process because all available secret keys must be tried. This flag is only honored for OpenPGP encryption.

GPGME\_ENCRYPT\_WRAP

SINCE: 1.8.0

The GPGME\_ENCRYPT\_WRAP symbol specifies that the input is an OpenPGP message and not a plain data. This is the counterpart to GPGME\_DECRYPT\_UNWRAP.

#### GPGME\_ENCRYPT\_WANT\_ADDRESS

SINCE: 1.11.0

The GPGME\_ENCRYPT\_WANT\_ADDRESS symbol requests that all supplied keys or key specifications include a syntactically valid mail address. If this is not the case the operation is not even tried and the error code GPG\_ERR\_INV\_USER\_ID is returned. Only the address part of the key specification is conveyed to the backend. As of now the key must be specified using the RECPSTRING argument of the extended encrypt functions. This feature is currently only supported for the OpenPGP crypto engine.

If GPG\_ERR\_UNUSABLE\_PUBKEY is returned, some recipients in RECP are invalid, but not all. In this case the plaintext might be encrypted for all valid recipients and returned in CIPHER (if this happens depends on the crypto engine). More information about the invalid recipients is available with gpgme\_op\_encrypt\_result.

If RECP is NULL, symmetric rather than public key encryption is performed. Symmetrically encrypted cipher text can be deciphered with gpgme\_op\_decrypt. Note that in this case the crypto backend needs to retrieve a passphrase from the user. Symmetric encryption is currently only supported for the OpenPGP crypto backend.

The function returns the error code GPG\_ERR\_NO\_ERROR if the ciphertext could be created successfully, GPG\_ERR\_INV\_VALUE if CTX, RECP, PLAIN or CIPHER is not a valid pointer, GPG\_ERR\_UNUSABLE\_PUBKEY if RECP contains some invalid recipients, GPG\_ERR\_BAD\_PASSPHRASE if the passphrase for the symmetric key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_encrypt\_start (gpgme\_ctx\_t CTX,  
gpgme\_key\_t RECP[], gpgme\_encrypt\_flags\_t FLAGS,  
gpgme\_data\_t PLAIN, gpgme\_data\_t CIPHER)

The function gpgme\_op\_encrypt\_start initiates a gpgme\_op\_encrypt operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion:::

References to the keys only need to be held for the duration of this call. The user can release its references to the keys after

this function returns, even if the operation is not yet finished.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `CTX`, `RSET`, `PLAIN` or `CIPHER` is not a valid pointer, and `GPG_ERR_UNUSABLE_PUBKEY` if `RSET` does not contain any valid recipients.

```
-- Function: gpgme_error_t gpgme_op_encrypt_ext (gpgme_ctx_t CTX,  
        gpgme_key_t RECP[], const char *RECPSTRING,  
        gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,  
        gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create key objects. Leading and trailing white space is removed from each line in `RECPSTRING`. The keys are then passed verbatim to the backend engine.

For the OpenPGP backend several special keywords are supported to modify the operation. These keywords are given instead of a key specification. The currently supported keywords are:

--hidden

--no-hidden

These keywords toggle between normal and hidden recipients for all following key specifications. When a hidden recipient is requested the `gpg` option `-R` (or `-F` in file mode) is used instead of `-r` (`-f` in file mode).

--file

--no-file

These keywords toggle between regular and file mode for all following key specification. In file mode the option `-f` or `-F` is passed to `gpg`. At least GnuPG version 2.1.14 is required to handle these options. The `GPGME_ENCRYPT_WANT_ADDRESS` flag is ignored in file mode.

--

This keyword disables all keyword detection up to the end of the string. All keywords are treated as verbatim arguments.

To create a `RECPSTRING` it is often useful to employ a `strconcat`

style function. For example this function creates a string to encrypt to two keys:

```
char *
xbuild_recpsstring (const char *key1, const char *key2)
{
    char *result = gpgrt_strconcat ("--\n", key1, "\n", key2, NULL);
    if (!result)
        { perror ("strconcat failed"); exit (2); }
    return result;
}
```

Note the use of the double dash here; unless you want to specify a keyword, it is a good idea to avoid any possible trouble with key specifications starting with a double dash. The used strconcat function is available in Libgpg-error 1.28 and later; Libgpg-error (aka Gpgrt) is a dependency of GPGME. The number of arguments to gpgrt\_strconcat is limited to 47 but that should always be sufficient. In case a larger and non-fixed number of keys are to be supplied the following code can be used:

```
char *
xbuild_long_recpsstring (void)
{
    gpgrt_stream_t memfp;
    const char *s;
    void *result;

    memfp = gpgrt_fopenmem (0, "w+b");
    if (!memfp)
        { perror ("fopenmem failed"); exit (2); }
    gpgrt_fputs ("--", memfp);
    while ((s = get_next_keyspec ()))
        {
            gpgrt_fputc ('\n', memfp);
            gpgrt_fputs (s, memfp);
        }
    gpgrt_fputc (0, memfp);
    if (gpgrt_ferror (memfp))
        { perror ("writing to memstream failed"); exit (2); }
    if (gpgrt_fclose_snatch (memfp, &result, NULL))
        { perror ("fclose_snatch failed"); exit (2); }
    return result;
}
```

In this example get\_next\_keyspec is expected to return the next key to be added to the string. Please take care: Encrypting to a large number of recipients is often questionable due to security

reasons and also for the technicality that all keys are currently passed on the command line to gpg which has as a platform specific length limitation.

-- Function: `gpgme_error_t gpgme_op_encrypt_ext_start (gpgme_ctx_t CTX, gpgme_key_t RECP[], const char *RECPSTRING, gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN, gpgme_data_t CIPHER)`

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_start` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create key objects. The keys are passed verbatim to the backend engine.

-- Data type: `gpgme_encrypt_result_t`  
This is a pointer to a structure used to store the result of a `gpgme_op_encrypt` operation. After successfully encrypting data, you can retrieve the pointer to the result with `gpgme_op_encrypt_result`. The structure contains the following members:

`gpgme_invalid_key_t invalid_recipients`

A linked list with information about all invalid keys for which the data could not be encrypted.

-- Function: `gpgme_encrypt_result_t gpgme_op_encrypt_result (gpgme_ctx_t CTX)`

The function `gpgme_op_encrypt_result` returns a `gpgme_encrypt_result_t` pointer to a structure holding the result of a `gpgme_op_encrypt` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_encrypt`, `gpgme_op_encrypt_start`, `gpgme_op_sign` or `gpgme_op_sign_start` operation. If this operation failed, this might be a `NULL` pointer. The returned pointer is only valid until the next operation is started on the context.

-- Function: `gpgme_error_t gpgme_op_encrypt_sign (gpgme_ctx_t CTX, gpgme_key_t RECP[], gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN, gpgme_data_t CIPHER)`

The function `gpgme_op_encrypt_sign` does a combined encrypt and sign operation. It is used like `gpgme_op_encrypt`, but the ciphertext also contains signatures for the signers listed in `CTX`.

The combined encrypt and sign operation is currently only available for the OpenPGP crypto engine.

```
-- Function: gpgme_error_t gpgme_op_encrypt_sign_start
(gpgme_ctx_t CTX, gpgme_key_t RECP[],
 gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,
 gpgme_data_t CIPHER)
```

The function `gpgme_op_encrypt_sign_start` initiates a `gpgme_op_encrypt_sign` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `CTX`, `RSET`, `PLAIN` or `CIPHER` is not a valid pointer.

```
-- Function: gpgme_error_t gpgme_op_encrypt_sign_ext (gpgme_ctx_t CTX,
 gpgme_key_t RECP[], const char *RECPSTRING,
 gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,
 gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_sign` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

```
-- Function: gpgme_error_t gpgme_op_encrypt_sign_ext_start
(gpgme_ctx_t CTX, gpgme_key_t RECP[], const char *RECPSTRING,
 gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,
 gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_sign_start` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

File: `gpgme.info`, Node: Miscellaneous, Next: Run Control, Prev: Crypto Operations, Up: Contexts

## 7.8 Miscellaneous operations

=====

Here are some support functions which are sometimes useful.

\* Menu:

- \* Running other Programs:: Running other Programs
- \* Using the Assuan protocol:: Using the Assuan protocol
- \* Checking for updates:: How to check for software updates

File: gpgme.info, Node: Running other Programs, Next: Using the Assuan protocol, Up: Miscellaneous

### 7.8.1 Running other Programs

-----

GPGME features an internal subsystem to run the actual backend engines. Along with data abstraction object this subsystem can be used to run arbitrary simple programs which even need not be related to cryptographic features. It may for example be used to run tools which are part of the GnuPG system but are not directly accessible with the GPGME API.

```
-- Function: gpgme_error_t gpgme_op_spawn (gpgme_ctx_t CTX,  
      const char *FILE, const char *ARGV[], gpgme_data_t DATAIN,  
      gpgme_data_t DATAOUT, gpgme_data_t DATAERR,  
      unsigned int FLAGS)
```

SINCE: 1.5.0

The function `gpgme_op_spawn` runs the program `FILE` with the arguments taken from the `NULL` terminated array `ARGV`. If no arguments are required `ARGV` may be given as `NULL`. In the latter case or if `argv[0]` is the empty string, GPGME uses the basename of `FILE` for `argv[0]`. The file descriptors `stdin`, `stdout`, and `stderr` are connected to the data objects `DATAIN`, `DATAOUT`, and `DATAERR`. If `NULL` is passed for one of these data objects the corresponding file descriptor is connected to `/dev/null`.

The value in `FLAGS` is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_SPAWN_DETACHED`

SINCE: 1.5.0

Under Windows this flag inhibits the allocation of a new console for the program. This is useful for a GUI application

which needs to call a command line helper tool.

#### GPGME\_SPAWN\_ALLOW\_SET\_FG

SINCE: 1.5.0

Under Windows this flag allows the called program to put itself into the foreground.

-- Function: `gpgme_error_t gpgme_op_spawn_start (gpgme_ctx_t CTX, const char *FILE, const char *ARGV[], gpgme_data_t DATAIN, gpgme_data_t DATAOUT, gpgme_data_t DATAERR, unsigned int FLAGS)`

SINCE: 1.5.0

This is the asynchronous variant of `gpgme_op_spawn`.

File: `gpgme.info`, Node: Using the Assuan protocol, Next: Checking for updates, Prev: Running other Programs, Up: Miscellaneous

#### 7.8.2 Using the Assuan protocol

-----

The Assuan protocol can be used to talk to arbitrary Assuan servers. By default it is connected to the GnuPG agent, but it may be connected to arbitrary servers by using `gpgme_ctx_set_engine_info`, passing the location of the servers socket as `FILE_NAME` argument, and an empty string as `HOME_DIR` argument.

The Assuan protocol functions use three kinds of callbacks to transfer data:

-- Data type: `gpgme_error_t (*gpgme_assuan_data_cb_t) (void *OPAQUE, const void *DATA, size_t DATALEN)`

SINCE: 1.2.0

This callback receives any data sent by the server. `OPAQUE` is the pointer passed to `gpgme_op_assuan_transact_start`, `DATA` of length `DATALEN` refers to the data sent.

-- Data type: `gpgme_error_t (*gpgme_assuan_inquire_cb_t) (void *OPAQUE, const char *NAME, const char *ARGS, gpgme_data_t *R_DATA)`

SINCE: 1.2.0

This callback is used to provide additional data to the Assuan

server. OPAQUE is the pointer passed to gpgme\_op\_assuan\_transact\_start, NAME and ARGS specify what kind of data the server requested, and R\_DATA is used to return the actual data.

Note: Returning data is currently not implemented in GPGME.

-- Data type: gpgme\_error\_t (\*gpgme\_assuan\_status\_cb\_t) (void \*OPAQUE, const char \*STATUS, const char \*ARGS)

SINCE: 1.2.0

This callback receives any status lines sent by the server. OPAQUE is the pointer passed to gpgme\_op\_assuan\_transact\_start, STATUS and ARGS denote the status update sent.

-- Function: gpgme\_error\_t gpgme\_op\_assuan\_transact\_start (gpgme\_ctx\_t CTX, const char \*COMMAND, gpgme\_assuan\_data\_cb\_t DATA\_CB, void \* DATA\_CB\_VALUE, gpgme\_assuan\_inquire\_cb\_t INQUIRE\_CB, void \* INQUIRE\_CB\_VALUE, gpgme\_assuan\_status\_cb\_t STATUS\_CB, void \* STATUS\_CB\_VALUE)

SINCE: 1.2.0

Send the Assuan COMMAND and return results via the callbacks. Any callback may be NULL. The result of the operation may be retrieved using gpgme\_wait\_ext.

Asynchronous variant.

-- Function: gpgme\_error\_t gpgme\_op\_assuan\_transact\_ext (gpgme\_ctx\_t CTX, const char \*COMMAND, gpgme\_assuan\_data\_cb\_t DATA\_CB, void \* DATA\_CB\_VALUE, gpgme\_assuan\_inquire\_cb\_t INQUIRE\_CB, void \* INQUIRE\_CB\_VALUE, gpgme\_assuan\_status\_cb\_t STATUS\_CB, void \* STATUS\_CB\_VALUE, gpgme\_error\_t \*OP\_ERR)

Send the Assuan COMMAND and return results via the callbacks. The result of the operation is returned in OP\_ERR.

Synchronous variant.

File: gpgme.info, Node: Checking for updates, Prev: Using the Assuan protocol, Up: Miscellaneous

7.8.3 How to check for software updates

-----

The GnuPG Project operates a server to query the current versions of software packages related to GnuPG. GPGME can be used to access this online database and check whether a new version of a software package is available.

-- Data type: `gpgme_query_swdb_result_t`  
SINCE: 1.8.0

This is a pointer to a structure used to store the result of a `gpgme_op_query_swdb` operation. After success full call to that function, you can retrieve the pointer to the result with `gpgme_op_query_swdb_result`. The structure contains the following member:

`name`

This is the name of the package.

`iversion`

The currently installed version or an empty string. This value is either a copy of the argument given to `gpgme_op_query_swdb` or the version of the installed software as figured out by GPGME or GnuPG.

`created`

This gives the date the file with the list of version numbers has originally be created by the GnuPG project.

`retrieved`

This gives the date the file was downloaded.

`warning`

If this flag is set either an error has occurred or some of the information in this structure are not properly set. For example if the version number of the installed software could not be figured out, the update flag may not reflect a required update status.

`update`

If this flag is set an update of the software is available.

`urgent`

If this flag is set an available update is important.

`noinfo`

If this flag is set, no valid information could be retrieved.

`unknown`

If this flag is set the given name is not known.

toold

If this flag is set the available information is not fresh enough.

error

If this flag is set some other error has occurred.

version

The version string of the latest released version.

reldate

The release date of the latest released version.

```
-- Function: gpgme_error_t gpgme_op_query_swdb (gpgme_ctx_t CTX,  
        const char *NAME, const char *IVERSION, gpgme_data_t RESERVED)
```

SINCE: 1.8.0

Query the software version database for software package NAME and check against the installed version given by IVERSION. If IVERSION is given as NULL a check is only done if GPGME can figure out the version by itself (for example when using "gpgme" or "gnupg"). If NULL is used for NAME the current gpgme version is checked. RESERVED must be set to 0.

```
-- Function: gpgme_query_swdb_result_t gpgme_op_query_swdb_result  
        (gpgme_ctx_t CTX)
```

SINCE: 1.8.0

The function gpgme\_op\_query\_swdb\_result returns a gpgme\_query\_swdb\_result\_t pointer to a structure holding the result of a gpgme\_op\_query\_swdb operation. The pointer is only valid if the last operation on the context was a successful call to gpgme\_op\_query\_swdb. If that call failed, the result might be a NULL pointer. The returned pointer is only valid until the next operation is started on the context CTX.

Here is an example on how to check whether GnuPG is current:

```
#include <gpgme.h>  
  
int  
main (void)  
{  
    gpg_error_t err;  
    gpgme_ctx_t ctx;
```

```

gpgme_query_swdb_result_t result;

gpgme_check_version (NULL);
err = gpgme_new (&ctx);
if (err)
    fprintf (stderr, "error creating context: %s\n", gpg_strerror (err));
else
    {
    gpgme_set_protocol (ctx, GPGME_PROTOCOL_GPGCONF);

    err = gpgme_op_query_swdb (ctx, "gnupg", NULL, 0);
    if (err)
        fprintf (stderr, "error querying swdb: %s\n", gpg_strerror (err));
    else
        {
        result = gpgme_op_query_swdb_result (ctx);
        if (!result)
            fprintf (stderr, "error querying swdb\n");
        if (!result->warning && !result->update)
            printf ("GnuPG version %s is current\n",
                result->iversion);
        else if (!result->warning && result->update)
            printf ("GnuPG version %s can be updated to %s\n",
                result->iversion, result->version);
        else
            fprintf (stderr, "error finding the update status\n");
        }
    gpgme_release (ctx);
    }
return 0;
}

```

File: gpgme.info, Node: Run Control, Prev: Miscellaneous, Up: Contexts

## 7.9 Run Control

=====

GPGME supports running operations synchronously and asynchronously. You can use asynchronous operation to set up a context up to initiating the desired operation, but delay performing it to a later point.

Furthermore, you can use an external event loop to control exactly when GPGME runs. This ensures that GPGME only runs when necessary and also prevents it from blocking for a long time.

\* Menu:

- \* **Waiting For Completion::**      Waiting until an operation is completed.
- \* **Using External Event Loops::**    Advanced control over what happens when.
- \* **Cancellation::**                      How to end pending operations prematurely.

File: gpgme.info, Node: Waiting For Completion, Next: Using External Event Loops, Up: Run Control

### 7.9.1 Waiting For Completion

-----  
-- Function: `gpgme_ctx_t gpgme_wait (gpgme_ctx_t CTX,  
          gpgme_error_t *STATUS, int HANG)`

The function `gpgme_wait` continues the pending operation within the context `CTX`. In particular, it ensures the data exchange between GPGME and the crypto backend and watches over the run time status of the backend process.

If `HANG` is true, the function does not return until the operation is completed or cancelled. Otherwise the function will not block for a long time.

The error status of the finished operation is returned in `STATUS` if `gpgme_wait` does not return `NULL`.

The `CTX` argument can be `NULL`. In that case, `gpgme_wait` waits for any context to complete its operation.

`gpgme_wait` can be used only in conjunction with any context that has a pending operation initiated with one of the `gpgme_op_*_start` functions except `gpgme_op_keylist_start` and `gpgme_op_trustlist_start` (for which you should use the corresponding `gpgme_op_*_next` functions). If `CTX` is `NULL`, all of such contexts are waited upon and possibly returned. Synchronous operations running in parallel, as well as key and trust item list operations, do not affect `gpgme_wait`.

In a multi-threaded environment, only one thread should ever call `gpgme_wait` at any time, regardless of whether `CTX` is specified or not. This means that all calls to this function should be fully synchronized by locking primitives. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

The function returns the `CTX` of the context which has finished the operation. If `HANG` is false, and the timeout expires, `NULL` is returned and `*status` will be set to 0. If an error occurs, `NULL` is returned and the error is returned in `*status`.

## 7.9.2 Using External Event Loops

-----

GPGME hides the complexity of the communication between the library and the crypto engine. The price of this convenience is that the calling thread can block arbitrary long waiting for the data returned by the crypto engine. In single-threaded programs, in particular if they are interactive, this is an unwanted side-effect. OTOH, if `gpgme_wait` is used without the HANG option being enabled, it might be called unnecessarily often, wasting CPU time that could be used otherwise.

The I/O callback interface described in this section lets the user take control over what happens when. GPGME will provide the user with the file descriptors that should be monitored, and the callback functions that should be invoked when a file descriptor is ready for reading or writing. It is then the users responsibility to decide when to check the file descriptors and when to invoke the callback functions. Usually this is done in an event loop, that also checks for events in other parts of the program. If the callback functions are only called when the file descriptors are ready, GPGME will never block. This gives the user more control over the program flow, and allows to perform other tasks when GPGME would block otherwise.

By using this advanced mechanism, GPGME can be integrated smoothly into GUI toolkits like GTK+ even for single-threaded programs.

\* Menu:

- \* I/O Callback Interface:: How I/O callbacks are registered.
- \* Registering I/O Callbacks:: How to use I/O callbacks for a context.
- \* I/O Callback Example:: An example how to use I/O callbacks.
- \* I/O Callback Example GTK+:: How to use GPGME with GTK+.
- \* I/O Callback Example GDK:: How to use GPGME with GDK.
- \* I/O Callback Example Qt:: How to use GPGME with Qt.

### 7.9.2.1 I/O Callback Interface

.....

-- Data type: `gpgme_error_t (*gpgme_io_cb_t) (void *DATA, int FD)`

The `gpgme_io_cb_t` type is the type of functions which GPGME wants to register as I/O callback handlers using the `gpgme_register_io_cb_t` functions provided by the user.

DATA and FD are provided by GPGME when the I/O callback handler is registered, and should be passed through to the handler when it is invoked by the user because it noticed activity on the file descriptor FD.

The callback handler always returns 0, but you should consider the return value to be reserved for later use.

-- Data type: `gpgme_error_t (*gpgme_register_io_cb_t) (void *DATA, int FD, int DIR, gpgme_io_cb_t FNC, void *FNC_DATA, void **TAG)`

The `gpgme_register_io_cb_t` type is the type of functions which can be called by GPGME to register an I/O callback function FNC for the file descriptor FD with the user. FNC\_DATA should be passed as the first argument to FNC when the handler is invoked (the second argument should be FD). If DIR is 0, FNC should be called by the user when FD is ready for writing. If DIR is 1, FNC should be called when FD is ready for reading.

DATA was provided by the user when registering the `gpgme_register_io_cb_t` function with GPGME and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the event loop to which the file descriptor should be added.

GPGME will call this function when a crypto operation is initiated in a context for which the user has registered I/O callback handler functions with `gpgme_set_io_cbs`. It can also call this function when it is in an I/O callback handler for a file descriptor associated to this context.

The user should return a unique handle in TAG identifying this I/O callback registration, which will be passed to the `gpgme_register_io_cb_t` function without interpretation when the file descriptor should not be monitored anymore.

-- Data type: `void (*gpgme_remove_io_cb_t) (void *TAG)`

The `gpgme_remove_io_cb_t` type is the type of functions which can be called by GPGME to remove an I/O callback handler that was registered before. TAG is the handle that was returned by the `gpgme_register_io_cb_t` for this I/O callback.

GPGME can call this function when a crypto operation is in an I/O callback. It will also call this function when the context is destroyed while an operation is pending.

-- Data type: `enum gpgme_event_io_t`

The `gpgme_event_io_t` type specifies the type of an event that is reported to the user by GPGME as a consequence of an I/O operation. The following events are defined:

#### GPGME\_EVENT\_START

The operation is fully initialized now, and you can start to run the registered I/O callback handlers now. Note that registered I/O callback handlers must not be run before this event is signalled. `TYPE_DATA` is NULL and reserved for later use.

#### GPGME\_EVENT\_DONE

The operation is finished, the last I/O callback for this operation was removed. The accompanying `TYPE_DATA` points to a struct `gpgme_io_event_done_data` variable that contains the status of the operation that finished. This event is signalled after the last I/O callback has been removed.

#### GPGME\_EVENT\_NEXT\_KEY

In a `gpgme_op_keylist_start` operation, the next key was received from the crypto engine. The accompanying `TYPE_DATA` is a `gpgme_key_t` variable that contains the key with one reference for the user.

#### GPGME\_EVENT\_NEXT\_TRUSTITEM

In a `gpgme_op_trustlist_start` operation, the next trust item was received from the crypto engine. The accompanying `TYPE_DATA` is a `gpgme_trust_item_t` variable that contains the trust item with one reference for the user.

-- Data type: `void (*gpgme_event_io_cb_t) (void *DATA, gpgme_event_io_t TYPE, void *TYPE_DATA)`

The `gpgme_event_io_cb_t` type is the type of functions which can be called by GPGME to signal an event for an operation running in a context which has I/O callback functions registered by the user.

`DATA` was provided by the user when registering the `gpgme_event_io_cb_t` function with GPGME and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the context in which this event has occurred.

`TYPE` will specify the type of event that has occurred. `TYPE_DATA` specifies the event further, as described in the above list of possible `gpgme_event_io_t` types.

GPGME can call this function in an I/O callback handler.

### 7.9.2.2 Registering I/O Callbacks

.....

-- Data type: struct gpgme\_io\_cbs

This structure is used to store the I/O callback interface functions described in the previous section. It has the following members:

`gpgme_register_io_cb_t add`

This is the function called by GPGME to register an I/O callback handler. It must be specified.

`void *add_priv`

This is passed as the first argument to the add function when it is called by GPGME. For example, it can be used to determine the event loop to which the file descriptor should be added.

`gpgme_remove_io_cb_t remove`

This is the function called by GPGME to remove an I/O callback handler. It must be specified.

`gpgme_event_io_cb_t event`

This is the function called by GPGME to signal an event for an operation. It must be specified, because at least the start event must be processed.

`void *event_priv`

This is passed as the first argument to the event function when it is called by GPGME. For example, it can be used to determine the context in which the event has occurred.

-- Function: void gpgme\_set\_io\_cbs (gpgme\_ctx\_t CTX,  
struct gpgme\_io\_cbs \*IO\_CBS)

The function gpgme\_set\_io\_cbs enables the I/O callback interface for the context CTX. The I/O callback functions are specified by IO\_CBS.

If IO\_CBS->add is NULL, the I/O callback interface is disabled for the context, and normal operation is restored.

-- Function: void gpgme\_get\_io\_cbs (gpgme\_ctx\_t CTX,  
struct gpgme\_io\_cbs \*IO\_CBS)

The function gpgme\_get\_io\_cbs returns the I/O callback functions

set with `gpgme_set_io_cbs` in `IO_CBS`.

File: `gpgme.info`, Node: `I/O Callback Example`, Next: `I/O Callback Example GTK+`, Prev: `Registering I/O Callbacks`, Up: `Using External Event Loops`

### 7.9.2.3 I/O Callback Example

.....

To actually use an external event loop, you have to implement the I/O callback functions that are used by GPGME to register and unregister file descriptors. Furthermore, you have to actually monitor these file descriptors for activity and call the appropriate I/O callbacks.

The following example illustrates how to do that. The example uses locking to show in which way the callbacks and the event loop can run concurrently. For the event loop, we use a fixed array. For a real-world implementation, you should use a dynamically sized structure because the number of file descriptors needed for a crypto operation in GPGME is not predictable.

```
#include <assert.h>
#include <errno.h>
#include <stdlib.h>
#include <pthread.h>
#include <sys/types.h>
#include <gpgme.h>

/* The following structure holds the result of a crypto operation. */
struct op_result
{
    int done;
    gpgme_error_t err;
};

/* The following structure holds the data associated with one I/O
callback. */
struct one_fd
{
    int fd;
    int dir;
    gpgme_io_cb_t fnc;
    void *fnc_data;
    void *loop;
};

struct event_loop
{

```

```

pthread_mutex_t lock;
#define MAX_FDS 32
/* Unused slots are marked with FD being -1. */
struct one_fd fds[MAX_FDS];
};

```

The following functions implement the I/O callback interface.

```

gpgme_error_t
add_io_cb (void *data, int fd, int dir, gpgme_io_cb_t fnc, void *fnc_data,
          void **r_tag)
{
    struct event_loop *loop = data;
    struct one_fd *fds = loop->fds;
    int i;

    pthread_mutex_lock (&loop->lock);
    for (i = 0; i < MAX_FDS; i++)
    {
        if (fds[i].fd == -1)
        {
            fds[i].fd = fd;
            fds[i].dir = dir;
            fds[i].fnc = fnc;
            fds[i].fnc_data = fnc_data;
            fds[i].loop = loop;
            break;
        }
    }
    pthread_mutex_unlock (&loop->lock);
    if (i == MAX_FDS)
        return gpg_error (GPG_ERR_GENERAL);
    *r_tag = &fds[i];
    return 0;
}

void
remove_io_cb (void *tag)
{
    struct one_fd *fd = tag;
    struct event_loop *loop = fd->loop;

    pthread_mutex_lock (&loop->lock);
    fd->fd = -1;
    pthread_mutex_unlock (&loop->lock);
}

void

```

```

event_io_cb (void *data, gpgme_event_io_t type, void *type_data)
{
    struct op_result *result = data;

    /* We don't support list operations here. */
    if (type == GPGME_EVENT_DONE)
    {
        result->done = 1;
        result->err = *type_data;
    }
}

```

The final missing piece is the event loop, which will be presented next. We only support waiting for the success of a single operation.

```

int
do_select (struct event_loop *loop)
{
    fd_set rfds;
    fd_set wfds;
    int i, n;
    int any = 0;
    struct timeval tv;
    struct one_fd *fdlist = loop->fds;

    pthread_mutex_lock (&loop->lock);
    FD_ZERO (&rfds);
    FD_ZERO (&wfds);
    for (i = 0; i < MAX_FDS; i++)
        if (fdlist[i].fd != -1)
            FD_SET (fdlist[i].fd, fdlist[i].dir ? &rfds : &wfds);
    pthread_mutex_unlock (&loop->lock);

    tv.tv_sec = 0;
    tv.tv_usec = 1000;

    do
    {
        n = select (FD_SETSIZE, &rfds, &wfds, NULL, &tv);
    }
    while (n < 0 && errno == EINTR);

    if (n < 0)
        return n; /* Error or timeout. */

    pthread_mutex_lock (&loop->lock);
    for (i = 0; i < MAX_FDS && n; i++)
    {

```

```

    if (fdlist[i].fd != -1)
    {
    if (FD_ISSET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfds))
        {
        assert (n);
        n--;
        any = 1;
        /* The I/O callback handler can register/remove callbacks,
           so we have to unlock the file descriptor list. */
        pthread_mutex_unlock (&loop->lock);
        (*fdlist[i].fnc) (fdlist[i].fnc_data, fdlist[i].fd);
        pthread_mutex_lock (&loop->lock);
        }
    }
    pthread_mutex_unlock (&loop->lock);
    return any;
}

void
wait_for_op (struct event_loop *loop, struct op_result *result)
{
    int ret;

    do
    {
        ret = do_select (loop);
    }
    while (ret >= 0 && !result->done);
}

```

The main function shows how to put it all together.

```

int
main (int argc, char *argv[])
{
    struct event_loop loop;
    struct op_result result;
    gpgme_ctx_t ctx;
    gpgme_error_t err;
    gpgme_data_t sig, text;
    int i;
    pthread_mutexattr_t attr;
    struct gpgme_io_cbs io_cbs =
    {
        add_io_cb,
        &loop,
        remove_io_cb,
    }
}

```

```

    event_io_cb,
    &result
};

init_gpgme ();

/* Initialize the loop structure. */

/* The mutex must be recursive, since remove_io_cb (which acquires a
   lock) can be called while holding a lock acquired in do_select. */
pthread_mutexattr_init (&attr);
pthread_mutexattr_settype (&attr, PTHREAD_MUTEX_RECURSIVE);
pthread_mutex_init (&loop.lock, &attr);
pthread_mutexattr_destroy (&attr);

for (i = 0; i < MAX_FDS; i++)
    loop.fds[i].fd = -1;

/* Initialize the result structure. */
result.done = 0;

err = gpgme_data_new_from_file (&sig, "signature", 1);
if (!err)
    err = gpgme_data_new_from_file (&text, "text", 1);
if (!err)
    err = gpgme_new (&ctx);
if (!err)
    {
        gpgme_set_io_cbs (ctx, &io_cbs);
        err = gpgme_op_verify_start (ctx, sig, text, NULL);
    }
if (err)
    {
        fprintf (stderr, "gpgme error: %s: %s\n",
                gpgme_strerror (err), gpgme_strerror (err));
        exit (1);
    }

wait_for_op (&loop, &result);
if (!result.done)
    {
        fprintf (stderr, "select error\n");
        exit (1);
    }
if (!result.err)
    {
        fprintf (stderr, "verification failed: %s: %s\n",
                gpgme_strerror (result.err), gpgme_strerror (result.err));
    }

```

```

    exit (1);
}
/* Evaluate verify result. */
...
return 0;
}

```

File: gpgme.info, Node: I/O Callback Example GTK+, Next: I/O Callback Example GDK, Prev: I/O Callback Example, Up: Using External Event Loops

#### 7.9.2.4 I/O Callback Example GTK+

.....

The I/O callback interface can be used to integrate GPGME with the GTK+ event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GTK+ specific setup.

```

#include <gtk/gtk.h>

struct my_gpgme_io_cb
{
    gpgme_io_cb_t fnc;
    void *fnc_data;
    guint input_handler_id
};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
{
    struct my_gpgme_io_cb *iocb = data;
    (*(iocb->fnc)) (iocb->data, source);
}

void
my_gpgme_remove_io_cb (void *data)
{
    struct my_gpgme_io_cb *iocb = data;
    gtk_input_remove (data->input_handler_id);
}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
{

```

```

struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
iocb->fnc = fnc;
iocb->data = fnc_data;
iocb->input_handler_id = gtk_input_add_full (fd, dir
      ? GDK_INPUT_READ
      : GDK_INPUT_WRITE,
      my_gpgme_io_callback,
      0, iocb, NULL);

*tag = iocb;
return 0;
}

```

File: gpgme.info, Node: I/O Callback Example GDK, Next: I/O Callback Example Qt, Prev: I/O Callback Example GTK+, Up: Using External Event Loops

### 7.9.2.5 I/O Callback Example GDK

.....

The I/O callback interface can also be used to integrate GPGME with the GDK event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GDK specific setup.

It is very similar to the GTK+ example in the previous section.

```

#include <gdk/gdk.h>

struct my_gpgme_io_cb
{
  gpgme_io_cb_t fnc;
  void *fnc_data;
  gint tag;
};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
{
  struct my_gpgme_io_cb *iocb = data;
  (*(iocb->fnc)) (iocb->data, source);
}

void
my_gpgme_remove_io_cb (void *data)
{
  struct my_gpgme_io_cb *iocb = data;
}

```

```

    gdk_input_remove (data->tag);
}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
{
    struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
    iocb->fnc = fnc;
    iocb->data = fnc_data;
    iocb->tag = gtk_input_add_full (fd, dir ? GDK_INPUT_READ : GDK_INPUT_WRITE,
                                   my_gpgme_io_callback, iocb, NULL);
    *tag = iocb;
    return 0;
}

```

File: gpgme.info, Node: I/O Callback Example Qt, Prev: I/O Callback Example GDK, Up: Using External Event Loops

#### 7.9.2.6 I/O Callback Example Qt

.....

The I/O callback interface can also be used to integrate GPGME with the Qt event loop. The following code snippets show how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any Qt specific setup.

```

#include <qsocketnotifier.h>
#include <qapplication.h>

struct IOCB {
    IOCB( GpgmeIOCb f, void * d, QSocketNotifier * n )
        : func( f ), data( d ), notifier( n ) {}
    GpgmeIOCb func;
    void * data;
    QSocketNotifier * notifier;
}

class MyApp : public QApplication {

// ...

    static void registerGpgmeIOCallback( void * data, int fd, int dir,
                                         GpgmeIOCb func, void * func_data,
                                         void ** tag ) {

```

```

QSocketNotifier * n =
    new QSocketNotifier( fd, dir ? QSocketNotifier::Read
                        : QSocketNotifier::Write );
connect( n, SIGNAL(activated(int)),
         qApp, SLOT(slotGpgmeIOCallback(int)) );
qApp->mIOCBs.push_back( IOCB( func, func_data, n ) );
*tag = (void*)n;
}

static void removeGpgmeIOCallback( void * tag ) {
    if ( !tag ) return;
    QSocketNotifier * n = static_cast<QSocketNotifier*>( tag );
    for ( QValueList<IOCB>::iterator it = qApp->mIOCBs.begin() ;
          it != qApp->mIOCBs.end() ; ++it )
        if ( it->notifier == n ) {
            delete it->notifier;
            qApp->mIOCBs.erase( it );
            return;
        }
}

public slots:
void slotGpgmeIOCallback( int fd ) {
    for ( QValueList<IOCB>::const_iterator it = mIOCBs.begin() ;
          it != mIOCBs.end() ; ++it )
        if ( it->notifier && it->notifier->socket() == fd )
            (*(it->func))( it->func_data, fd );
}

// ...

private:
    QValueList<IOCB> mIOCBs;
    // ...
};

```

File: gpgme.info, Node: Cancellation, Prev: Using External Event Loops, Up: Run Control

### 7.9.3 Cancellation

-----

Sometimes you do not want to wait for an operation to finish. GPGME provides two different functions to achieve that. The function `gpgme_cancel` takes effect immediately. When it returns, the operation is effectively canceled. However, it has some limitations and can not be used with synchronous operations. In contrast, the function `gpgme_cancel_async` can be used with any context and from any thread,

but it is not guaranteed to take effect immediately. Instead, cancellation occurs at the next possible time (typically the next time I/O occurs in the target context).

-- Function: `gpgme_ctx_t gpgme_cancel (gpgme_ctx_t CTX)`  
SINCE: 0.4.5

The function `gpgme_cancel` attempts to cancel a pending operation in the context `CTX`. This only works if you use the global event loop or your own event loop.

If you use the global event loop, you must not call `gpgme_wait` during cancellation. After successful cancellation, you can call `gpgme_wait` (optionally waiting on `CTX`), and the context `CTX` will appear as if it had finished with the error code `GPG_ERR_CANCEL`.

If you use an external event loop, you must ensure that no I/O callbacks are invoked for this context (for example by halting the event loop). On successful cancellation, all registered I/O callbacks for this context will be unregistered, and a `GPGME_EVENT_DONE` event with the error code `GPG_ERR_CANCEL` will be signalled.

The function returns an error code if the cancellation failed (in this case the state of `CTX` is not modified).

-- Function: `gpgme_ctx_t gpgme_cancel_async (gpgme_ctx_t CTX)`  
SINCE: 1.1.7

The function `gpgme_cancel_async` attempts to cancel a pending operation in the context `CTX`. This can be called by any thread at any time after starting an operation on the context, but will not take effect immediately. The actual cancellation happens at the next time GPGME processes I/O in that context.

The function returns an error code if the cancellation failed (in this case the state of `CTX` is not modified).

File: `gpgme.info`, Node: UI Server Protocol, Next: Debugging, Prev: Contexts, Up: Top

## Appendix A The GnuPG UI Server Protocol

\*\*\*\*\*

This section specifies the protocol used between clients and a User Interface Server (UI server). This protocol helps to build a system where all cryptographic operations are done by a server and the server is responsible for all dialogs. Although GPGME has no direct support

for this protocol it is believed that servers will utilize the GPGME library; thus having the specification included in this manual is an appropriate choice. This protocol should be referenced as The GnuPG UI Server Protocol.

A server needs to implement these commands:(1)

\* Menu:

- \* UI Server Encrypt::        Encrypt a message.
- \* UI Server Sign::         Sign a message.
- \* UI Server Decrypt::      Decrypt a message.
- \* UI Server Verify::      Verify a message.
- \* UI Server Set Input Files::    Specifying the input files to operate on.
- \* UI Server Sign/Encrypt Files::  Encrypting and signing files.
- \* UI Server Verify/Decrypt Files:: Decrypting and verifying files.
- \* UI Server Import/Export Keys::  Managing certificates.
- \* UI Server Checksum Files::    Create and verify checksums for files.
- \* Miscellaneous UI Server Commands::  Commands not related to a specific operation.

----- Footnotes -----

(1) In all examples we assume that the connection has already been established; see the Assuan manual for details.

File: gpgme.info, Node: UI Server Encrypt, Next: UI Server Sign, Up: UI Server Protocol

#### A.1 UI Server: Encrypt a Message

=====

Before encryption can be done the recipients must be set using the command:

-- Command: RECIPIENT STRING

Set the recipient for the encryption. `STRING` is an RFC-2822 recipient name ("mailbox" as per section 3.4). This command may or may not check the recipient for validity right away; if it does not all recipients are expected to be checked at the time of the `ENCRYPT` command. All `RECIPIENT` commands are cumulative until a successful `ENCRYPT` command or until a `RESET` command. Linefeeds are obviously not allowed in `STRING` and should be folded into spaces (which are equivalent).

To tell the server the source and destination of the data, the next two commands are to be used:

-- Command: INPUT FD=N

Set the file descriptor for the message to be encrypted to N. The message send to the server is binary encoded.

GpgOL is a Windows only program, thus N is not a libc file descriptor but a regular system handle. Given that the Assuan connection works over a socket, it is not possible to use regular inheritance to make the file descriptor available to the server. Thus DuplicateHandle needs to be used to duplicate a handle to the server process. This is the reason that the server needs to implement the GETINFO pid command. Sending this command a second time replaces the file descriptor set by the last one.

-- Command: OUTPUT FD=N [--binary]

Set the file descriptor to be used for the output (i.e. the encrypted message) to N. If the option --binary is given the output shall be in binary format; if not given, the output for OpenPGP needs to be ASCII armored and for CMS Base-64 encoded. For details on the file descriptor, see the INPUT command.

The setting of the recipients, the data source and destination may happen in any order, even intermixed. If this has been done the actual encryption operation is called using:

-- Command: ENCRYPT --protocol=NAME

This command reads the plaintext from the file descriptor set by the INPUT command, encrypts it and writes the ciphertext to the file descriptor set by the OUTPUT command. The server may (and should) overlap reading and writing. The recipients used for the encryption are all the recipients set so far. If any recipient is not usable the server should take appropriate measures to notify the user about the problem and may cancel the operation by returning an error code. The used file descriptors are void after this command; the recipient list is only cleared if the server returns success.

Because GpgOL uses a streaming mode of operation the server is not allowed to auto select the protocol and must obey to the mandatory PROTOCOL parameter:

OpenPGP

Use the OpenPGP protocol (RFC-2440).

CMS

Use the CMS (PKCS#7) protocol (RFC-3852).

To support automagically selection of the protocol depending on the selected keys, the server MAY implement the command:

-- Command: PREP\_ENCRYPT [--protocol=NAME] [--expect-sign]

This command considers all recipients set so far and decides whether it is able to take input and start the actual encryption. This is kind of a dry-run ENCRYPT without requiring or using the input and output file descriptors. The server shall cache the result of any user selection to avoid asking this again when the actual ENCRYPT command is sent. The --protocol option is optional; if it is not given, the server should allow the user to select the protocol to be used based on the recipients given or by any other means.

If --expect-sign is given the server should expect that the message will also be signed and use this hint to present a unified recipient and signer selection dialog if possible and desired. A selected signer should then be cached for the expected SIGN command (which is expected in the same session but possible on another connection).

If this command is given again before a successful ENCRYPT command, the second one takes effect.

Before sending the OK response the server shall tell the client the protocol to be used (either the one given by the argument or the one selected by the user) by means of a status line:

-- Status line: PROTOCOL NAME

Advise the client to use the protocol NAME for the ENCRYPT command. The valid protocol names are listed under the description of the ENCRYPT command. The server shall emit exactly one PROTOCOL status line.

Here is an example of a complete encryption sequence; client lines are indicated by a C:, server responses by S::

```
C: RESET
S: OK
C: RECIPIENT foo@example.net
S: OK
C: RECIPIENT bar@example.com
S: OK
C: PREP_ENCRYPT
S: S PROTOCOL OpenPGP
S: OK
C: INPUT FD=17
S: OK
C: OUTPUT FD=18
```

S: OK  
C: ENCRYPT  
S: OK

File: gpgme.info, Node: UI Server Sign, Next: UI Server Decrypt, Prev: UI Server Encrypt, Up: UI Server Protocol

## A.2 UI Server: Sign a Message

=====

The server needs to implement opaque signing as well as detached signing. Due to the nature of OpenPGP messages it is always required to send the entire message to the server; sending just the hash is not possible. The following two commands are required to set the input and output file descriptors:

-- Command: INPUT FD=N

Set the file descriptor for the message to be signed to N. The message send to the server is binary encoded. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N [--binary]

Set the file descriptor to be used for the output. The output is either the complete signed message or in case of a detached signature just that detached signature. If the option --binary is given the output shall be in binary format; if not given, the output for OpenPGP needs to be ASCII armored and for CMS Base-64 encoded. For details on the file descriptor, see the INPUT command.

To allow the server the selection of a non-default signing key the client may optionally use the SENDER command, see \*note command SENDER::.

The signing operation is then initiated by:

-- Command: SIGN --protocol=NAME [--detached]

Sign the data set with the INPUT command and write it to the sink set by OUTPUT. NAME is the signing protocol used for the message. For a description of the allowed protocols see the ENCRYPT command. With option --detached given, a detached signature is created; this is actually the usual way the command is used.

The client expects the server to send at least this status information before the final OK response:

-- Status line: MICALG STRING

The STRING represents the hash algorithm used to create the signature. It is used with RFC-1847 style signature messages and defined by PGP/MIME (RFC-3156) and S/MIME (RFC-3851). The GPGME library has a supporting function `gpgme_hash_algo_name` to return the algorithm name as a string. This string needs to be lowercased and for OpenPGP prefixed with "pgp-".

File: gpgme.info, Node: UI Server Decrypt, Next: UI Server Verify, Prev: UI Server Sign, Up: UI Server Protocol

### A.3 UI Server: Decrypt a Message

=====

Decryption may include the verification of OpenPGP messages. This is due to the often used combined signing/encryption modus of OpenPGP. The client may pass an option to the server to inhibit the signature verification. The following two commands are required to set the input and output file descriptors:

-- Command: INPUT FD=N

Set the file descriptor for the message to be decrypted to N. The message send to the server is either binary encoded or in the case of OpenPGP ASCII armored. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N

Set the file descriptor to be used for the output. The output is binary encoded. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

The decryption is started with the command:

-- Command: DECRYPT --protocol=NAME [--no-verify]

[--export-session-key]

NAME is the encryption protocol used for the message. For a description of the allowed protocols see the ENCRYPT command.

This argument is mandatory. If the option --no-verify is given, the server should not try to verify a signature, in case the input data is an OpenPGP combined message. If the option

--export-session-key is given and the underlying engine knows how to export the session key, it will appear on a status line

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For files:  
- cJSON.c, cJSON.h

```
#+begin_quote  
Copyright (c) 2009 Dave Gamble
```

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```
#+end_quote  
Just GNU it!  
2011-12-02 Werner Koch <wk@g10code.com>
```

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

```
2011-10-25 Marcus Brinkmann <marcus@g10code.com>
```

```
* m4/pth.m4: Removed.  
* configure.ac: Remove check for pth and automake conditional  
HAVE_PTH.
```

```
2011-06-16 Marcus Brinkmann <marcus@g10code.com>
```

Release 1.3.1

\* configure.ac: Set LT version to C19/A8/R0.

2011-05-06 Marcus Brinkmann <marcus@g10code.com>

\* Makefile.am (SUBDIRS): Remove complus.

\* configure.ac (AC\_CONFIG\_FILES): Remove complus/Makefile.

(BUILD\_COMPLUS): Remove AM\_CONDITIONAL.

\* complus/: Remove very old and stale component.

\* acinclude.m4 (GNUPG\_FIX\_HDR\_VERSION): Remove.

2011-04-14 Werner Koch <wk@g10code.com>

\* configure.ac: Require automake 1.11.

2011-04-06 Werner Koch <wk@g10code.com>

\* autogen.sh (--build-w32): Support option --build-w64.

\* configure.ac (HAVE\_W64\_SYSTEM): Define.

(INSERT\_\_TYPEDEFS\_FOR\_GPGME\_H): New.

(GPGME\_CONFIG\_HOST): New.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* configure.ac (NEED\_LIBASSUAN\_VERSION): Bump to 2.0.2 for system hooks.

2010-12-30 Werner Koch <wk@g10code.com>

\* configure.ac: Support a git revision.

2010-11-03 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys/types.h and

sys.stat.h.

2010-11-02 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys.time.h.

2010-08-19 Werner Koch <wk@g10code.com>

\* configure.ac (AH\_BOTTOM): Define GPG\_ERR\_ENABLE\_ERRNO\_MACROS.

2010-05-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for setlocale.

2010-05-07 Werner Koch <wk@g10code.com>

\* configure.ac: Change checks to always require libassuan.

2010-05-07 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Update the thing.

\* configure.ac: Check for locale.h.

2010-05-06 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Detect Windows CE.

(HAVE\_W32CE\_SYSTEM): New symbol and automake conditional.

\* ltmain.sh, m4/libtool.m4: Patch so that it works for Windows CE.

\* configure.ac: Require libgpg-error 1.8.

2010-03-15 Werner Koch <wk@g10code.com>

\* configure.ac (emacs\_local\_vars\_begin)

(emacs\_local\_vars\_read\_only, emacs\_local\_vars\_end): New.

2010-01-22 Werner Koch <wk@g10code.com>

\* autogen.sh (--build-w32): Add --with-libassuan-prefix.

2010-01-11 Marcus Brinkmann <marcus@g10code.de>

Release 1.3.0.

2009-12-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Do not use echo -n. Test for \_\_thread.

2009-12-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Make largefile check more robust.

2009-12-10 Werner Koch <wk@g10code.com>

\* configure.ac: Check for getgid and getegid.

2009-12-08 Marcus Brinkmann <marcus@g10code.de>

Update to libtool 2.2.6a.

\* configure.ac: Invoke AC\_CONFIG\_MACRO\_DIR.  
(AC\_LIBTOOL\_WIN32\_DLL, AC\_LIBTOOL\_RC): Replace by ...  
(LT\_PREREQ, LT\_INIT, LT\_LANG): ... these.  
\* config.guess, config.sub, install-sh, ltmain.sh, m4/libtool.m4:  
Updated to libtool 2.2.6a.  
\* m4/ltoptions.m4, m4/ltsugar.m4, m4/ltversion.m4,  
m4/lt~obsolete.m4: New files from libtool 2.2.6a.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Activate UIServer if FD passing is enabled and Assuan is available.

2009-10-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for argp.h and error\_t.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION\_DEFAULT): Bump to 1.4.0 as 1.3.0 was development versions only.

2009-10-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add support for G13.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_CONFIG\_FILES): Remove assuan/Makefile.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Replace internal libassuan by external libassuan.  
\* m4/libassuan.m4: New file.  
\* Makefile.am (assuan): Remove variable.  
(SUBDIRS): Remove \${assuan}.  
\* assuan/: Removed.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add AC\_TYPE\_UINTPTR\_T.

\* assuan/assuan.h [\_ASSUAN\_IN\_GPGME\_BUILD\_ASSUAN]: Declare \_gpgme\_io\_connect.

2009-06-18 Marcus Brinkmann <marcus@g10code.de>

Released GPGME 1.2.0.

\* configure.ac (my\_version): Set to 1.2.0.  
(LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump.  
(LIBGPGME\_LT\_REVISION): Reset.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add infrastructure for compile time check of  
\_FILE\_OFFSET\_BITS.

2009-04-19 Moritz <moritz@gnu.org>

\* Makefile.am (DISTCHECK\_CONFIGURE\_FLAGS): Specify --with-gpg.

2009-03-06 Marcus Brinkmann <marcus@g10code.de>

\* assuan/: Update to libassuan SVN 2009-03-06.

2009-01-26 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CONFIG\_FILES): Add tests/opassuan/Makefile.

2008-12-08 Marcus Brinkmann <marcus@g10code.de>

Release GPGME 1.1.8.

\* configure.ac: Bump API revision.

2008-11-03 Marcus Brinkmann <marcus@g10code.com>

\* configure.ac: Replace gpgme paths with src.

\* gpgme: Move to ...

\* src: ... this new directory.

2008-10-20 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CONFIG\_FILES): Add gpgme.h.

(GNUPG\_FIX\_HDR\_VERSION): Remove.

2008-10-17 Marcus Brinkmann <marcus@g10code.com>

Release GPGME 1.1.7.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

2008-09-19 Moritz <moritz@gnu.org>

\* configure.ac: Remove bogus "esac".

2008-09-16 Marcus Brinkmann <marcus@g10code.com>

\* configure.ac (\_XOPEN\_SOURCE) [apple-darwin]: Define it.

2008-07-04 Werner Koch <wk@g10code.com>

\* config.guess, config.sub: Update to 2007-11-19. Also update missing et al scripts.

2008-04-01 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_INIT): Fix quoting.

2008-01-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump required version of automake up to 1.10.

\* autogen.sh: Fix aclocal check.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

Release GPGME 1.1.6.

\* configure.ac: Support gpgconf.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): Do not close process handle here. Use this function also on Unix systems.

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): Fix last change.

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): New function, use it if \_ASSUAN\_IN\_GPGME\_BUILD\_ASSUAN.

2007-09-17 Werner Koch <wk@g10code.com>

\* configure.ac: Use the svn version magic.

2007-09-07 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for C++, Qt and support --enable-w32-qt.

\* m4/pkg.m4: New file.

2007-08-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (--enable-w32-glib): Use --enableval, not

--withval.

2007-07-16 Marcus Brinkmann <marcus@g10code.de>

\* assuan/assuan-socket.c (`_assuan_close`): Always use `close()`.

\* assuan/assuan.h (`_gpgme_io_close`): New prototype.

(`close`): New macro, define as `_gpgme_io_close`.

2007-07-13 Marcus Brinkmann <marcus@g10code.de>

\* assuan/assuan-io.c (`_assuan_simple_read`, `_assuan_simple_write`):

Always use read/write (which means `_gpgme_io_read` and `_gpgme_io_write`).

2007-07-09 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.5.

\* `configure.ac` (`LIBGPGME_LT_REVISION`): Bump for release.

2007-07-08 Marcus Brinkmann <marcus@g10code.de>

\* `configure.ac` (`GPGSM_DEFAULT`) [`*-mingw32*`]: Initialize it.

(`HAVE_ASSUAN_H`): Set to 1 if we have it.

(`funopen`): Use `AC_REPLACE_FUNCS`.

(`USE_DESCRIPTOR_PASSING`): Define to 1 if we have it. Do not define it at all if we don't.

(`NETLIBS`) [`have_w32_system`]: Add `-lws2_32`.

(`DIRSEP_C`, `DIRSEP_S`, `EXPSEP_C`, `EXPSEP_S`, `PATHSEP_S`)

(`HAVE_DOSISH_SYSTEM`): Remove definitions.

\* `assuan/assuan.h` (`_assuan_funopen`): Define to `_gpgme_funopen`.

\* `assuan/funopen.c`: Move to `../gpgme/funopen.c`.

\* `assuan/Makefile.am` (`libassuan_la_SOURCES`): Remove `funopen.c`.

2007-07-04 Marcus Brinkmann <marcus@g10code.de>

\* `assuan/Makefile.am` (`INCLUDES`): Include `$(top_srcdir)/gpgme`.

\* `assuan/assuan.h`: Include `<ath.h>` instead of trying to duplicate the definitions.

\* `assuan/`: Update files to 2007-07-04 version of `assuan`.

\* `autogen.sh`: Use `=` not `==` in test.

2007-03-05 Werner Koch <wk@g10code.com>

Released 1.1.4.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

\* autogen.sh: New option --force.

2007-01-29 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.3.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

2007-01-26 Werner Koch <wk@g10code.com>

\* configure.ac: Changed gpg and gpgsm version checks to work with arbitrary names of the gpg binary. New option --disable-gpg-test and --disable-gpgsm-test.

2007-01-09 Werner Koch <wk@g10code.com>

\* configure.ac (NEED\_GPG\_VERSION, NEED\_GPGSM\_VERSION): Must define after it may have been changed by an option.

2007-01-08 Werner Koch <wk@g10code.com>

\* configure.ac: Require gpg-error 1.4 due to the use of gpg\_error\_from\_syserror.  
(HAVE\_ASSUAN\_H): New.

2007-01-05 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add options --with-gpg-version and --with-gpgsm-version to allow overriding the minimum version requirements.

2006-12-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Fix two typos in last change.

2006-12-03 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Use descriptor passing only if --enable-fd-passing is provided.

\* configure.ac: Add check for use of descriptor passing.

2006-11-29 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION): Bump to 1.3.0.

2006-09-19 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Turn stpcpy into a replacement function.  
Check for unistd.h and add setenv as replacement function.

2006-07-29 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for network libraries and set NETLIBS.

2006-07-06 Marcus Brinkmann <marcus@g10code.de>

\* lang, lang/cl: New subdirectories.  
\* lang/Makefile.am, lang/README: New files.  
\* configure.ac (AC\_CONFIG\_FILES): Add lang/Makefile,  
lang/cl/Makefile and lang/cl/gpgme.asd.  
\* Makefile.am (SUBDIRS): Add lang.

2006-03-02 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.1.

\* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump for  
release.  
(LIBGPGME\_LT\_REVISION): Reset to 0 for release.

2006-01-05 Werner Koch <wk@g10code.com>

\* configure.ac: Test for inline feature.  
(AH\_BOTTOM): New to define the pure attribute.

2006-01-03 Werner Koch <wk@g10code.com>

\* configure.ac: Append SVN revision to the version.

2005-11-18 Werner Koch <wk@g10code.com>

\* configure.ac (BUILD\_REVISION): New.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add support for --enable-w32-glib (disabled by  
default). Invoke AM\_PATH\_GLIB\_2\_0.

2005-11-16 Werner Koch <wk@g10code.com>

\* configure.ac (CFLAGS) [W32]: Make sure that -mms-bitfields are used.

2005-11-15 Werner Koch <wk@g10code.com>

\* configure.ac: Create BUILD\_FILEVERSION from SVN Revision.

\* autogen.sh [W32]: Build shared and static versions of the library.

2005-10-20 Marcus Brinkmann <marcus@g10code.de>

\* w32-dll/ChangeLog, w32-dll/build-dll, w32-dll/gpgme.def: Remove files.

\* configure.ac: Instead checking for windres and dlltool, invoke AC\_LIBTOOL\_WIN32\_DLL and AC\_LIBTOOL\_RC.

\* src/Makefile.am [HAVE\_W32\_SYSTEM]: Use libtool, which simplifies the rules.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.0.

\* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump for release.

(LIBGPGME\_LT\_REVISION): Reset to 0 for release.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (HAVE\_PTH): Don't add \$PTH\_CFLAGS to \$CFLAGS here.

2005-08-26 Werner Koch <wk@g10code.com>

\* configure.ac (SEPCONSTANTS): New to define DIRSEP\_C et al.

2005-08-19 Werner Koch <wk@g10code.com>

\* configure.ac [W32]: Create values for versioninfo.rc and list substitute versioninfo.rc.

\* configure.ac: Define ENABLE\_GPGSM.

2005-08-08 Werner Koch <wk@g10code.com>

\* configure.ac (stpcpy): Changed from replace to test.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AH\_BOTTOM): Removed.

2005-03-09 Werner Koch <wk@g10code.com>

\* acinclude.m4 (GNUPG\_CHECK\_VA\_COPY): Assume no when cross-compiling.

\* Makefile.am (EXTRA\_DIST): Include autogen.sh

\* autogen.sh: Added the usual code to build for W32 (--build-w32).

\* configure.ac: Fixed the mingw32 host string, removed OS/2 stuff.

(HAVE\_DRIVE\_LETTERS): Removed.

(HAVE\_W32\_SYSTEM): Added.

(AC\_GNU\_SOURCE): New to replace the identical AH\_VERBATIM.

(AH\_BOTTOM): Added.

2004-12-28 Werner Koch <wk@g10code.com>

Released 1.0.2.

\* Makefile.am (AUTOMAKE\_OPTIONS): Build bzip 2 version.

(ACLOCAL\_AMFLAGS): Add -I m4.

\* configure.ac: Require automake 1.9.3 and autoconf 2.59.

\* acinclude.m4: Changed quoting for automake 1.9.

\* README: Use SHA1 instead of MD5.

2004-12-11 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Replace ttypename\_r if it doesn't exist (and warn in that case).

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* README: Refer to COPYING.LESSER and "each file" instead of COPYING.

\* COPYING.LESSER: New file.

\* gpgme.spec.in (%doc): Add COPYING.LESSER.

\* acinclude.m4, configure.ac, Makefile.am: Change license to LGPL 2.1 or later.

\* TODO: Add copyright notice.

\* README.CVS: Likewise.

\* configure.ac (GPGSM\_VERSION): Fix filter to get it.

2004-10-22 Marcus Brinkmann <marcus@g10code.de>

Released 1.0.1.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 2.  
(AC\_INIT): Set version to 1.0.1.

\* configure.ac: Set HAVE\_GPGSM to true only if \$GPGSM is not "no".

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

Released 1.0.0.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 1.  
(AC\_INIT): Set version to 1.0.0.

\* Makefile.am (EXTRA\_DIST): Remove README-alpha.  
\* README-alpha: Remove file.

2004-09-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Disable AC\_CONFIG\_MACRO\_DIR for now.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Improve diagnostics with version check.

\* configure.ac: Print diagnostics about found thread libraries at  
the end. Check for the versions of GPG and GPGSM and print the  
found versions at the end.  
(HAVE\_GPGSM): Do not require GPGSM to exist and be readable.  
(AC\_CONFIG\_MACRO\_DIR): Invoke with argument m4.

\* acinclude.m4: Add copyright notice.  
(jm\_GLIBC21, AM\_PATH\_GPG\_ERROR, \_AC\_PTH\_ERROR, \_AC\_PTH\_VERBOSE,  
AC\_CHECK\_PTH): Removed.

2004-06-23 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for <sys/uio.h>.

2004-06-08 Marcus Brinkmann <marcus@g10code.de>

Released 0.9.0.

\* configure.ac (AC\_INIT): Set version number to 0.9.0.  
(LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump up by one.  
(LIBGPGME\_LT\_REVISION): Reset to zero.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (GPGME\_CONFIG\_API\_VERSION): New variable,

substitute it.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.7.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump it up.

2004-04-02 Thomas Schwinge <schwinge@nic-nac-project.de>

\* autogen.sh: Added ACLOCAL\_FLAGS.

2004-04-06 Werner Koch <wk@gnupg.org>

Released 0.4.6.

\* config.guess, config.sub, ltmain.sh: Updated to those from libtools 1.5.4.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.5.

\* configure.ac (NEED\_GPGSM\_VERSION): Bump up to 1.9.6.

\* Makefile.am (EXTRA\_DIST): Remove autogen.sh and README.CVS.

2004-02-18 Werner Koch <wk@gnupg.org>

\* configure.ac: Make the check for funopen fail with just a warning.

2004-02-11 Werner Koch <wk@gnupg.org>

\* autogen.sh (check\_version): Removed bashism and simplified.

2004-02-10 Werner Koch <wk@gnupg.org>

\* configure.ac: Fixed funopen test change.

2004-02-06 Moritz Schulte <mo@g10code.com>

\* configure.ac: Fix funopen replacement mechanism.

2004-01-31 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add invocation of AC\_SYS\_LARGEFILE, AC\_TYPE\_OFF\_T and AC\_FUNC\_FSEEKO.

2004-01-12 Werner Koch <wk@gnupg.org>

Released 0.4.4.

- \* configure.ac: Bumbed LT\_Revision; now at C12/A1/R1.
- (NEED\_GPGSM\_VERSION): Set to 1.9.3.
- (min\_automake\_version): Added.
- \* README.CVS: New.
- \* Makefile.am (EXTRA\_DIST): Added README.CVS.
- \* autogen.sh: Updated.

2003-11-19 Werner Koch <wk@gnupg.org>

- \* acinclude.m4: Add AM\_PATH\_GPG\_ERROR.
- \* configure.ac: Check for timegm. Made warning messages more prominent.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.3.

- \* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump up by 1.
- (LIBGPGME\_LT\_REVISION): Set to 0.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Require libpgp-error 0.5.
- \* acinclude.m4: Remove libtool cruft, add jm\_GLIBC21.
- \* configure.ac: Add check for getenv\_r, and call jm\_GLIBC21.
- Define HAVE\_THREAD\_SAFE\_GETENV if appropriate.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Remove GPGME\_CONFIG\_LIBS and GPGME\_CONFIG\_CFLAGS.

2003-09-02 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Move invocation of AC\_CANONICAL\_HOST up to suppress warning by autoconf.

2003-08-30 Robert Schiele <rschiele@uni-mannheim.de>

- \* gpgme.spec.in: % {\_infodir}/dir is not packaged, remove to prevent checking failure.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: If building Assuan, check for funopen and fopencookie, and make isascii, putc\_unlocked and memrchr replacement functions.

(AM\_PATH\_GPG\_ERROR): Require 0.3.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version to 0.4.3.

2003-07-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 1.

Released 0.4.2.

2003-07-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Complain if libgpg-error is not found.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version to 0.4.2.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_CURRENT): Bump up to 11.

\* configure.ac: Use AM\_PATH\_GPG\_ERROR.

\* configure.ac: Check for libgpg-error. Define GPG\_ERR\_SOURCE\_DEFAULT.

2003-05-26 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION): Bump up to 1.2.2.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

In all files, replace the Gpgme\* type names with the new gpgme\_\* type names.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* assuan/: Update files to 2002-11-10 version of assuan.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* bonobo/gpgme.c, bonobo/main.c, bonobo/main.h, bonobo/Makefile, bonobo/Makefile.am, bonobo/Makefile.in: Dead files removed.  
\* configure.ac: Remove automake conditional BUILD\_BONOBO (AC\_CONFIG\_FILES): Remove bonobo/Makefile.  
\* Makefile.am (bonobo): Remove variable.  
(SUBDIRS): Remove \${bonobo}.

\* configure.ac: Remove all uses of GNUPG\_CHECK\_TYPEDEF, for byte, ushort, ulong, u16 and u32.  
\* acinclude.m4 (GNUPG\_CHECK\_TYPEDEF): Remove macro.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: New conditional HAVE\_LD\_VERSION\_SCRIPT.  
Call AC\_CANONICAL\_HOST, use host instead target.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump up to 0.4.1.

Released 0.4.0.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (automake\_vers): Require 1.7 (really 1.7.1) for the conditional source distribution bug fix.

2002-12-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_CURRENT): Increase by one.  
(LIBGPGME\_LT\_AGE, LIBGPGME\_LT\_REVISION): Set to 0.

2002-11-28 Marcus Brinkmann <marcus@g10code.de>

\* NEWS: Add note about moving "gpgmeplug" to the "cryptplug" package.  
\* README: Remove instructions related to "gpgmeplug".  
\* configure.ac: Remove enable option "gpgmeplug" and automake conditional BUILD\_GPGMEPLUG, as well as the status info about it.  
(GPGMEPLUG): Remove variable.  
\* Makefile.am (gpgmeplug): Remove variable.  
(SUBDIRS): Remove \${gpgmeplug}.  
\* cryptplug.h, gpgme-openpgp.c, gpgmeplug.dox, gpgme-smime.c, Makefile.am, gpgmeplug.c, ChangeLog: Files removed.

2002-11-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Disable GPGSM for all dosish systems.

2002-10-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add automake conditional HAVE\_GPGSM.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version up to 0.4.0.

(NEED\_GPG\_VERSION): Bump up to 1.2.0.

(NEED\_GPGSM\_VERSION): Bump up to 0.9.0.

\* README: Update version numbers.

\* NEWS: Start entry for 0.4.0.

2002-09-20 Werner Koch <wk@gnupg.org>

Released 0.3.11.

\* configure.ac: Bump up LIBGPGME\_LT\_REVISION.

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys/select.h.

2002-09-04 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (autoconf\_vers): Bump up to 2.53 to get the @&t@  
quadrigraph. Always cutting the edge!

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Create and substitute LTLIBOBS.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.10.

\* NEWS: Update for 0.3.9 release.

\* configure.ac: Bump up LIBGPGME\_LT\_REVISION.

2002-08-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.spec.in: Changed user name in Wojciech Polak's email  
address from ghostface to polak per request by himself.

2002-08-28 Werner Koch <wk@gnupg.org>

\* acinclude.m4 (GNUPG\_CHECK\_VA\_COPY): New.

\* configure.ac: Use it.

2002-08-23 Werner Koch <wk@gnupg.org>

\* configure.ac (GPGME\_CONFIG\_CFLAGS): Renamed from GPGME\_CFLAGS and removed the libpath because it is set by the config script.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump version number to 0.3.10.

\* NEWS: Add template for development version.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.9.

\* NEWS: Update for 0.3.9 release.

\* Makefile.am (EXTRA\_DIST): Add gpgme.spec.in.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* jnlib/argparse.c, jnlib/argparse.h, jnlib/ChangeLog, jnlib/dotlock.c, jnlib/dotlock.h, jnlib/libjnlib-config.h, jnlib/logging.c, jnlib/logging.h, jnlib/Makefile.am, jnlib/mischelp.h, jnlib/README, jnlib/stringhelp.c, jnlib/stringhelp.h, jnlib/strlist.c, jnlib/strlist.h, jnlib/types.h, jnlib/xmalloc.c, jnlib/xmalloc.h: Remove files.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (SUBDIRS): Remove jnlib.

\* configure.ac: Don't check for unsigned short or unsigned long.

Don't check for memicmp, strtwr, strtoul, memmove, stricmp.

Make stpcpy a replaced function.

Don't define HAVE\_JNLIB\_LOGGING.

Don't generate jnlib/Makefile.

2002-07-02 Werner Koch <wk@gnupg.org>

\* configure.ac: Bumped version number to 0.3.9; add a comment on when to change it.

\* gpgme.spec.in: New. Contributed by Wojciech Polak.

\* Makefile.am (dist-hook): New.

\* AUTHORS: Added Wojciech and bug reporting addresses.

2002-06-25 Werner Koch <wk@gnupg.org>

Released 0.3.8.

\* configure.ac: Bumbed LT version to 9/3/0.  
(NEED\_GPGSM\_VERSION): Need 0.3.8 due to fixed export command.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.7.

\* configure.ac (AC\_INIT): Set version to 0.3.7.  
(LIBGPGME\_LT\_REVISION): Add one.

\* README: Document version requirement correctly.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* acinclude.m4: Fix Pth check so that it doesn't error out if pth  
is not found.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add checks for Pth and pthreads.  
\* acinclude.m4: Add slightly hacked check for pth (seems to be an  
autoconf version problem).

2002-05-21 Werner Koch <wk@gnupg.org>

\* configure.ac (NEED\_GPGSM\_VERSION): We need gpgsm 0.3.7.

2002-05-03 Werner Koch <wk@gnupg.org>

Released 0.3.6.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* acconfig.h: File removed.  
\* configure.ac (NEED\_GPG\_VERSION): Add description.  
(NEED\_GPGSM\_VERSION): Likewise.  
(HAVE\_DOSISH\_SYSTEM): Likewise.  
(HAVE\_DRIVE\_LETTERS): Likewise.  
(GPG\_PATH): Likewise.  
(GPGSM\_PATH): Likewise.  
\* acinclude.m4 (GNUPG\_CHECK\_TYPEDEF): Likewise.

2002-04-01 Werner Koch <wk@gnupg.org>

Released 0.3.5.

2002-03-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add automake conditional HAVE\_DOSISH\_SYSTEM.

2002-03-04 Werner Koch <wk@gnupg.org>

\* configure.ac: Bumbed version to 0.3.4-cvs to continue development.

Released 0.3.4.

\* configure.ac: Bumbed LT version numbers to (7,1,0), requires  
gpgsm 0.3.1.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Change version number to snapshot CVS  
version.

2002-02-13 Werner Koch <wk@gnupg.org>

\* configure.ac (vasprintf,fopencookie): Add checks.

2002-02-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version to 0.3.3.  
\* jnlib/Makefile.am: Revert to older version that includes xmalloc  
but not dotlock and some other files. Reported by Stphane  
Corthsy.

2002-02-10 Marcus Brinkmann <marcus@g10code.de>

\* Released 0.3.2.

\* configure.ac (AC\_INIT): Bump version to 0.3.2.  
\* jnlib/libjnlibconfig.h: Revert to older version that doesn't  
expect libgcrypt. Reported by Jose Carlos Garcia Sogo  
<jsogo@debian.org>.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* Released 0.3.1.

\* configure.ac (LIBGPGME\_LT\_CURRENT): Bump it up to 6!  
(NEED\_GPGSM\_VERSION): Bump it up to 0.3.0!  
(AC\_INIT): Bump version to 0.3.1

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (HAVE\_JNLIB\_LOGGING): Define always for assuan.

2001-12-19 Werner Koch <wk@gnupg.org>

\* configure.ac (VERSION,PACKAGE): Defined and subst. Used for AM\_INIT\_AUTOMAKE and moved all version number more to the top.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (libtool\_vers): Bump to 1.4.

\* configure.ac (LIBGPGME\_LT\_CURRENT): Increment.  
(LIBGPGME\_LT\_AGE): Reset.  
Improve comment.  
Fix wrong comment character.

2001-12-18 Werner Koch <wk@gnupg.org>

\* acinclude.m4 (GNUPG\_FIX\_HDR\_VERSION): Fixed for new automake.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (GPG): Substitute this variable.  
(GPGSM): Likewise.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_CONFIG\_FILES): Add tests/gpg/Makefile and tests/gpgsm/Makefile.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (gpgmeplug): New variable, set to gpgmeplug if [BUILD\_GPGMEPLUG].  
\* configure.ac (AC\_CONFIG\_FILES): Add gpgmeplug/Makefile.  
Support --enable-gpgmeplug.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Tighten version dependencies.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (SUBDIRS): Support building the assuan library (currently if GPGSM\_PATH is set)..  
\* configure.ac: Support building the assuan library.  
\* assuan: New directory, populated with the Assuan library (copied from the newpg repository).

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPGSM\_VERSION): New variable. Treat it similarly to NEED\_GPG\_VERSION.

\* acconfig.h: Likewise.

2001-11-18 Marcus Brinkmann <marcus@g10code.de>

\* configure.in: Renamed to ...

\* configure.ac: ... this. Update to autoconf 2.52. Lots of small changes in the transition. Support --with-gpg=PATH and --with-gpgsm=PATH options. Check if test suites can be run.

\* acconfig.h: Add GPGSM\_PATH.

\* Makefile.am: New variable `tests', set to `tests' if RUN\_GPG\_TESTS.

(SUBDIRS): Replace string `tests' with variable `tests'.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Invoke automake with `-a' (add missing files).

Do not invoke configure.

2001-09-17 Werner Koch <wk@gnupg.org>

Released 0.2.3.

\* configure.in (NEED\_GPG\_VERSION): Set to 1.0.6. Incremented LT current and age.

\* Makefile.am (SUBDIRS): Add doc

2001-06-12 Werner Koch <wk@gnupg.org>

Released 0.2.2.

2001-04-05 Werner Koch <wk@gnupg.org>

\* configure.in (NEED\_GPG\_VERSION): Set to 1.0.4g

2001-04-02 Werner Koch <wk@gnupg.org>

Released 0.2.1.

Changed the copyright notices all over the place.

2001-02-28 Werner Koch <wk@gnupg.org>

Released 0.2.0.

2001-01-18 Werner Koch <wk@gnupg.org>

\* autogen.sh: Added option --build-w32.

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2011 g10 Code GmbH

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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File: gpgme.info, Node: UI Server Verify, Next: UI Server Set Input Files, Prev: UI Server Decrypt, Up: UI Server Protocol

#### A.4 UI Server: Verify a Message

=====

The server needs to support the verification of opaque signatures as well as detached signatures. The kind of input sources controls what kind message is to be verified.

-- Command: MESSAGE FD=N

This command is used with detached signatures to set the file descriptor for the signed data to N. The data is binary encoded (used verbatim). For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: INPUT FD=N

Set the file descriptor for the opaque message or the signature part of a detached signature to N. The message send to the server is either binary encoded or in the case of OpenPGP ASCII armored. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N

Set the file descriptor to be used for the output. The output is binary encoded and only used for opaque signatures. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

The verification is then started using:

-- Command: VERIFY --protocol=NAME [--silent]

NAME is the signing protocol used for the message. For a description of the allowed protocols see the ENCRYPT command.

This argument is mandatory. Depending on the combination of MESSAGE INPUT and OUTPUT commands, the server needs to select the appropriate verification mode:

MESSAGE and INPUT

This indicates a detached signature. Output data is not applicable.

INPUT

This indicates an opaque signature. As no output command has been given, the server is only required to check the signature.

#### INPUT and OUTPUT

This indicates an opaque signature. The server shall write the signed data to the file descriptor set by the output command. This data shall even be written if the signatures cant be verified.

With --silent the server shall not display any dialog; this is for example used by the client to get the content of opaque signed messages. The client expects the server to send at least this status information before the final OK response:

#### -- Status line: SIGSTATUS FLAG DISPLAYSTRING

Returns the status for the signature and a short string explaining the status. Valid values for FLAG are:

none

The message has a signature but it could not not be verified due to a missing key.

green

The signature is fully valid.

yellow

The signature is valid but additional information was shown regarding the validity of the key.

red

The signature is not valid.

DISPLAYSTRING is a percent-and-plus-encoded string with a short human readable description of the status. For example

```
S SIGSTATUS green Good+signature+from+Keith+Moon+<keith@example.net>
```

Note that this string needs to fit into an Assuan line and should be short enough to be displayed as short one-liner on the clients window. As usual the encoding of this string is UTF-8 and it should be send in its translated form.

The server shall send one status line for every signature found on the message.

File: gpgme.info, Node: UI Server Set Input Files, Next: UI Server Sign/Encrypt Files, Prev: UI Server Verify, Up: UI Server Protocol

A.5 UI Server: Specifying the input files to operate on.

=====

All file related UI server commands operate on a number of input files or directories, specified by one or more FILE commands:

-- Command: FILE [--clear] NAME

Add the file or directory NAME to the list of pathnames to be processed by the server. The parameter NAME must be an absolute path name (including the drive letter) and is percent escaped (in particular, the characters %, = and white space characters are always escaped). If the option --clear is given, the list of files is cleared before adding NAME.

Historical note: The original spec did not define --clear but the keyword --continued after the file name to indicate that more files are to be expected. However, this has never been used and thus removed from the specs.

File: gpgme.info, Node: UI Server Sign/Encrypt Files, Next: UI Server Verify/Decrypt Files, Prev: UI Server Set Input Files, Up: UI Server Protocol

A.6 UI Server: Encrypting and signing files.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

-- Command: ENCRYPT\_FILES --nohup

-- Command: SIGN\_FILES --nohup

-- Command: ENCRYPT\_SIGN\_FILES --nohup

Request that the files specified by FILE are encrypted and/or signed. The command selects the default action. The UI server may allow the user to change this default afterwards interactively, and even abort the operation or complete it only on some of the selected files and directories.

What it means to encrypt or sign a file or directory is specific to the preferences of the user, the functionality the UI server provides, and the selected protocol. Typically, for each input file a new file is created under the original filename plus a protocol specific extension (like .gpg or .sig), which contain the encrypted/signed file or a detached signature. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The ENCRYPT\_SIGN\_FILES command requests a combined sign and encrypt operation. It may not be available for all protocols (for example, it is available for OpenPGP but not for CMS).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: UI Server Verify/Decrypt Files, Next: UI Server Import/Export Keys, Prev: UI Server Sign/Encrypt Files, Up: UI Server Protocol

#### A.7 UI Server: Decrypting and verifying files.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

- Command: DECRYPT\_FILES --nohup
- Command: VERIFY\_FILES --nohup
- Command: DECRYPT\_VERIFY\_FILES --nohup

Request that the files specified by FILE are decrypted and/or verified. The command selects the default action. The UI server may allow the user to change this default afterwards interactively, and even abort the operation or complete it only on some of the selected files and directories.

What it means to decrypt or verify a file or directory is specific to the preferences of the user, the functionality the UI server provides, and the selected protocol. Typically, for decryption, a new file is created for each input file under the original filename minus a protocol specific extension (like .gpg) which contains the original plaintext. For verification a status is displayed for each signed input file, indicating if it is signed, and if yes, if the signature is valid. For files that are signed and encrypted, the VERIFY command transiently decrypts the file to verify the enclosed signature. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: UI Server Import/Export Keys, Next: UI Server Checksum Files, Prev: UI Server Verify/Decrypt Files, Up: UI Server Protocol

#### A.8 UI Server: Managing certificates.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

-- Command: IMPORT\_FILES --nohup  
Request that the certificates contained in the files specified by FILE are imported into the local certificate databases.

For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

FIXME: It may be nice to support an EXPORT command as well, which is enabled by the context menu of the background of a directory.

File: gpgme.info, Node: UI Server Checksum Files, Next: Miscellaneous UI Server Commands, Prev: UI Server Import/Export Keys, Up: UI Server Protocol

#### A.9 UI Server: Create and verify checksums for files.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

-- Command: CHECKSUM\_CREATE\_FILES --nohup  
Request that checksums are created for the files specified by FILE. The choice of checksum algorithm and the destination storage and format for the created checksums depend on the preferences of the user and the functionality provided by the UI server. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

-- Command: CHECKSUM\_VERIFY\_FILES --nohup  
Request that checksums are created for the files specified by FILE and verified against previously created and stored checksums. The choice of checksum algorithm and the source storage and format for previously created checksums depend on the preferences of the user and the functionality provided by the UI

server. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

If the source storage of previously created checksums is available to the user through the Windows shell, this command may also accept such checksum files as FILE arguments. In this case, the UI server should instead verify the checksum of the referenced files as if they were given as INPUT files.

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: Miscellaneous UI Server Commands, Prev: UI Server Checksum Files, Up: UI Server Protocol

#### A.10 Miscellaneous UI Server Commands

=====

The server needs to implement the following commands which are not related to a specific command:

-- Command: GETINFO WHAT

This is a multi purpose command, commonly used to return a variety of information. The required subcommands as described by the WHAT parameter are:

pid

Return the process id of the server in decimal notation using an Assuan data line.

To allow the server to pop up the windows in the correct relation to the client, the client is advised to tell the server by sending the option:

-- Command option: window-id NUMBER

The NUMBER represents the native window ID of the clients current window. On Windows systems this is a windows handle (HWND) and on X11 systems it is the X Window ID. The number needs to be given as a hexadecimal value so that it is easier to convey pointer values (e.g. HWND).

A client may want to fire up the certificate manager of the server. To do this it uses the Assuan command:

-- Command: START\_KEYMANAGER

The server shall pop up the main window of the key manager (aka

certificate manager). The client expects that the key manager is brought into the foreground and that this command immediately returns (does not wait until the key manager has been fully brought up).

A client may want to fire up the configuration dialog of the server. To do this it uses the Assuan command:

-- Command: START\_CONFDialog

The server shall pop up its configuration dialog. The client expects that this dialog is brought into the foreground and that this command immediately returns (i.e. it does not wait until the dialog has been fully brought up).

When doing an operation on a mail, it is useful to let the server know the address of the sender:

-- Command: SENDER [--info] [--protocol=NAME] EMAIL

EMAIL is the plain ASCII encoded address ("addr-spec" as per RFC-2822) enclosed in angle brackets. The address set with this command is valid until a successful completion of the operation or until a RESET command. A second command overrides the effect of the first one; if EMAIL is not given and --info is not used, the server shall use the default signing key.

If option --info is not given, the server shall also suggest a protocol to use for signing. The client may use this suggested protocol on its own discretion. The same status line as with PREP\_ENCRYPT is used for this.

The option --protocol may be used to give the server a hint on which signing protocol should be preferred.

To allow the UI-server to visually identify a running operation or to associate operations the server MAY support the command:

-- Command: SESSION NUMBER [STRING]

The NUMBER is an arbitrary value, a server may use to associate simultaneous running sessions. It is a 32 bit unsigned integer with 0 as a special value indicating that no session association shall be done.

If STRING is given, the server may use this as the title of a window or, in the case of an email operation, to extract the senders address. The string may contain spaces; thus no plus-escaping is used.

This command may be used at any time and overrides the effect of

the last command. A RESET undoes the effect of this command.

File: gpgme.info, Node: Debugging, Next: Deprecated Functions, Prev: UI Server Protocol, Up: Top

## Appendix B How to solve problems

\*\*\*\*\*

Everyone knows that software often does not do what it should do and thus there is a need to track down problems. This is in particular true for applications using a complex library like GPGME and of course also for the library itself. Here we give a few hints on how to solve such problems.

First of all you should make sure that the keys you want to use are installed in the GnuPG engine and are usable. Thus the first test is to run the desired operation using `gpg` or `gpgsm` on the command line. If you cant figure out why things dont work, you may use GPGMEs built in trace feature. This feature is either enabled using the environment variable `GPGME_DEBUG` or, if this is not possible, by calling the function `gpgme_set_global_flag`. The value is the trace level and an optional file name. If no file name is given the trace output is printed to `stderr`.

For example

```
GPGME_DEBUG=9:/home/user/mygpgme.log
```

(Note that under Windows you use a semicolon in place of the colon to separate the fields.)

A trace level of 9 is pretty verbose and thus you may want to start off with a lower level. The exact definition of the trace levels and the output format may change with any release; you need to check the source code for details. In any case the trace log should be helpful to understand what is going on. Warning: The trace log may reveal sensitive details like passphrases or other data you use in your application. If you are asked to send a log file, make sure that you run your tests only with play data.

File: gpgme.info, Node: Deprecated Functions, Next: Library Copying, Prev: Debugging, Up: Top

## Appendix C Deprecated Functions

\*\*\*\*\*

For backward compatibility GPGME has a number of functions, data types and constants which are deprecated and should not be used anymore. We document here those which are really old to help understanding old code and to allow migration to their modern counterparts.

\*Warning:\* These interfaces will be removed in a future version of GPGME.

-- Function: void gpgme\_key\_release (gpgme\_key\_t KEY)

The function gpgme\_key\_release is equivalent to gpgme\_key\_unref.

-- Function: void gpgme\_trust\_item\_release (gpgme\_trust\_item\_t ITEM)

The function gpgme\_trust\_item\_release is an alias for gpgme\_trust\_item\_unref.

-- Function: gpgme\_error\_t gpgme\_op\_import\_ext (gpgme\_ctx\_t CTX, gpgme\_data\_t KEYDATA, int \*NR)

SINCE: 0.3.9

The function gpgme\_op\_import\_ext is equivalent to:

```
gpgme_error_t err = gpgme_op_import (ctx, keydata);
if (!err)
{
    gpgme_import_result_t result = gpgme_op_import_result (ctx);
    *nr = result->considered;
}
```

-- Data type: gpgme\_error\_t (\*gpgme\_edit\_cb\_t) (void \*HANDLE, gpgme\_status\_code\_t STATUS, const char \*ARGS, int FD)

The gpgme\_edit\_cb\_t type is the type of functions which GPGME calls if it a key edit operation is on-going. The status code STATUS and the argument line ARGS are passed through by GPGME from the crypto engine. The file descriptor FD is -1 for normal status messages. If STATUS indicates a command rather than a status message, the response to the command should be written to FD. The HANDLE is provided by the user at start of operation.

The function should return GPG\_ERR\_FALSE if it did not handle the status code, 0 for success, or any other error value.

-- Function: gpgme\_error\_t gpgme\_op\_edit (gpgme\_ctx\_t CTX, gpgme\_key\_t KEY, gpgme\_edit\_cb\_t FNC, void \*HANDLE, gpgme\_data\_t OUT)

SINCE: 0.3.9

Note: This function is deprecated, please use gpgme\_op\_interact instead.

The function gpgme\_op\_edit processes the key KEY interactively, using the edit callback function FNC with the handle HANDLE. The

callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object OUT.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by GPGME.

The function returns the error code `GPG_ERR_NO_ERROR` if the edit operation completes successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer, and any error returned by the crypto engine or the edit callback handler.

```
-- Function: gpgme_error_t gpgme_op_edit_start (gpgme_ctx_t CTX,  
        gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE,  
        gpgme_data_t OUT)
```

SINCE: 0.3.9

Note: This function is deprecated, please use `gpgme_op_interact_start` instead.

The function `gpgme_op_edit_start` initiates a `gpgme_op_edit` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

```
-- Function: gpgme_error_t gpgme_op_card_edit (gpgme_ctx_t CTX,  
        gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE,  
        gpgme_data_t OUT)
```

Note: This function is deprecated, please use `gpgme_op_interact` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit` is analogous to `gpgme_op_edit`, but should be used to process the smart card corresponding to the key `KEY`.

```
-- Function: gpgme_error_t gpgme_op_card_edit_start (gpgme_ctx_t CTX,  
        gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE,  
        gpgme_data_t OUT)
```

Note: This function is deprecated, please use `gpgme_op_interact_start` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit_start` initiates a

gpgme\_op\_card\_edit operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation was started successfully, and GPG\_ERR\_INV\_VALUE if CTX or KEY is not a valid pointer.

-- Function: gpgme\_error\_t gpgme\_data\_new\_with\_read\_cb  
(gpgme\_data\_t \*DH, int (\*READFUNC) (void \*HOOK, char \*BUFFER,  
size\_t COUNT, size\_t \*NREAD), void \*HOOK\_VALUE)

The function gpgme\_data\_new\_with\_read\_cb creates a new gpgme\_data\_t object and uses the callback function READFUNC to retrieve the data on demand. As the callback function can supply the data in any way it wants, this is the most flexible data type GPGME provides. However, it can not be used to write data.

The callback function receives HOOK\_VALUE as its first argument whenever it is invoked. It should return up to COUNT bytes in BUFFER, and return the number of bytes actually read in NREAD. It may return 0 in NREAD if no data is currently available. To indicate EOF the function should return with an error code of -1 and set NREAD to 0. The callback function may support to reset its internal read pointer if it is invoked with BUFFER and NREAD being NULL and COUNT being 0.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, GPG\_ERR\_INV\_VALUE if DH or READFUNC is not a valid pointer, and GPG\_ERR\_ENOMEM if not enough memory is available.

-- Function: gpgme\_error\_t gpgme\_data\_rewind (gpgme\_data\_t DH)  
The function gpgme\_data\_rewind is equivalent to:

```
return (gpgme_data_seek (dh, 0, SEEK_SET) == -1)  
? gpgme_error_from_errno (errno) : 0;
```

-- Data type: gpgme\_attr\_t  
The gpgme\_attr\_t type is used to specify a key or trust item attribute. The following attributes are defined:

#### GPGME\_ATTR\_KEYID

This is the key ID of a sub key. It is representable as a string.

For trust items, the trust item refers to the key with this ID.

#### GPGME\_ATTR\_FPR

This is the fingerprint of a sub key. It is representable as a string.

#### GPGME\_ATTR\_ALGO

This is the crypto algorithm for which the sub key can be used. It is representable as a string and as a number. The numbers correspond to the enum `gcry_pk_algos` values in the `gcrypt` library.

#### GPGME\_ATTR\_LEN

This is the key length of a sub key. It is representable as a number.

#### GPGME\_ATTR\_CREATED

This is the timestamp at creation time of a sub key. It is representable as a number.

#### GPGME\_ATTR\_EXPIRE

This is the expiration time of a sub key. It is representable as a number.

#### GPGME\_ATTR\_OTRUST

XXX FIXME (also for trust items)

#### GPGME\_ATTR\_USERID

This is a user ID. There can be more than one user IDs in a `GPGME_KEY_T` object. The first one (with index 0) is the primary user ID. The user ID is representable as a number.

For trust items, this is the user ID associated with this trust item.

#### GPGME\_ATTR\_NAME

This is the name belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_EMAIL

This is the email address belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_COMMENT

This is the comment belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_VALIDITY

This is the validity belonging to a user ID. It is representable as a string and as a number. See below for a list of available validities.

For trust items, this is the validity that is associated with this trust item.

#### GPGME\_ATTR\_UID\_REVOKED

This specifies if a user ID is revoked. It is representable as a number, and is 1 if the user ID is revoked, and 0 otherwise.

#### GPGME\_ATTR\_UID\_INVALID

This specifies if a user ID is invalid. It is representable as a number, and is 1 if the user ID is invalid, and 0 otherwise.

#### GPGME\_ATTR\_LEVEL

This is the trust level of a trust item.

#### GPGME\_ATTR\_TYPE

This returns information about the type of key. For the string function this will either be "PGP" or "X.509". The integer function returns 0 for PGP and 1 for X.509. It is also used for the type of a trust item.

#### GPGME\_ATTR\_IS\_SECRET

This specifies if the key is a secret key. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_REVOKED

This specifies if a sub key is revoked. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_INVALID

This specifies if a sub key is invalid. It is representable as a number, and is 1 if the key is invalid, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_EXPIRED

This specifies if a sub key is expired. It is representable as a number, and is 1 if the key is expired, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_DISABLED

This specifies if a sub key is disabled. It is representable as a number, and is 1 if the key is disabled, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_CAPS

This is a description of the capabilities of a sub key. It is representable as a string. The string contains the letter e if the key can be used for encryption, s if the key can be used for signatures, and c if the key can be used for certifications.

#### GPGME\_ATTR\_CAN\_ENCRYPT

This specifies if a sub key can be used for encryption. It is representable as a number, and is 1 if the sub key can be used for encryption, and 0 otherwise.

#### GPGME\_ATTR\_CAN\_SIGN

This specifies if a sub key can be used to create data signatures. It is representable as a number, and is 1 if the sub key can be used for signatures, and 0 otherwise.

#### GPGME\_ATTR\_CAN\_CERTIFY

This specifies if a sub key can be used to create key certificates. It is representable as a number, and is 1 if the sub key can be used for certifications, and 0 otherwise.

#### GPGME\_ATTR\_SERIAL

The X.509 issuer serial attribute of the key. It is representable as a string.

#### GPGME\_ATTR\_ISSUE

The X.509 issuer name attribute of the key. It is representable as a string.

#### GPGME\_ATTR\_CHAINID

The X.509 chain ID can be used to build the certification chain. It is representable as a string.

```
-- Function: const char * gpgme_key_get_string_attr (gpgme_key_t KEY,  
gpgme_attr_t WHAT, const void *RESERVED, int IDX)
```

The function `gpgme_key_get_string_attr` returns the value of the string-representable attribute `WHAT` of key `KEY`. If the attribute is an attribute of a sub key or an user ID, `IDX` specifies the sub key or user ID of which the attribute value is returned. The argument `RESERVED` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute cant be returned as a string, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

-- Function: unsigned long gpgme\_key\_get\_ulong\_attr (gpgme\_key\_t KEY, gpgme\_attr\_t WHAT, const void \*RESERVED, int IDX)

The function gpgme\_key\_get\_ulong\_attr returns the value of the number-representable attribute WHAT of key KEY. If the attribute is an attribute of a sub key or an user ID, IDX specifies the sub key or user ID of which the attribute value is returned. The argument RESERVED is reserved for later use and should be NULL.

The function returns 0 if the attribute cant be returned as a number, KEY is not a valid pointer, IDX out of range, or RESERVED not NULL.

The signatures on a key are only available if the key was retrieved via a listing operation with the GPGME\_KEYLIST\_MODE\_SIGS mode enabled, because it is expensive to retrieve all signatures of a key.

So, before using the below interfaces to retrieve the signatures on a key, you have to make sure that the key was listed with signatures enabled. One convenient, but blocking, way to do this is to use the function gpgme\_get\_key.

-- Data type: gpgme\_attr\_t

The gpgme\_attr\_t type is used to specify a key signature attribute. The following attributes are defined:

#### GPGME\_ATTR\_KEYID

This is the key ID of the key which was used for the signature. It is representable as a string.

#### GPGME\_ATTR\_ALGO

This is the crypto algorithm used to create the signature. It is representable as a string and as a number. The numbers correspond to the enum gcry\_pk\_algos values in the gcrypt library.

#### GPGME\_ATTR\_CREATED

This is the timestamp at creation time of the signature. It is representable as a number.

#### GPGME\_ATTR\_EXPIRE

This is the expiration time of the signature. It is representable as a number.

#### GPGME\_ATTR\_USERID

This is the user ID associated with the signing key. The user ID is representable as a number.

#### GPGME\_ATTR\_NAME

This is the name belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_EMAIL

This is the email address belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_COMMENT

This is the comment belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_KEY\_REVOKED

This specifies if a key signature is a revocation signature. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

#### GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

#### GPGME\_ATTR\_SIG\_STATUS

This is the same value as returned by `gpgme_get_sig_status`.

-- Function: `const char * gpgme_key_sig_get_string_attr`  
(`gpgme_key_t KEY`, `int UID_IDX`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_key_sig_get_string_attr` returns the value of the string-representable attribute `WHAT` of the signature `IDX` on the user ID `UID_IDX` in the key `KEY`. The argument `RESERVED` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `UID_IDX` or `IDX` out of range, or `RESERVED` not `NULL`.

-- Function: `unsigned long gpgme_key_sig_get_ulong_attr`  
(`gpgme_key_t KEY`, `int UID_IDX`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_key_sig_get_ulong_attr` returns the value of the number-representable attribute `WHAT` of the signature `IDX` on the

user ID `UID_IDX` in the key `KEY`. The argument `RESERVED` is reserved for later use and should be `NULL`.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `UID_IDX` or `IDX` out of range, or `RESERVED` not `NULL`.

Trust items have attributes which can be queried using the interfaces below. The attribute identifiers are shared with those for key attributes. \*Note Information About Keys::.

```
-- Function: const char * gpgme_trust_item_get_string_attr
(gpgme_trust_item_t ITEM, gpgme_attr_t WHAT,
const void *RESERVED, int IDX)
```

The function `gpgme_trust_item_get_string_attr` returns the value of the string-representable attribute `WHAT` of trust item `ITEM`. The arguments `IDX` and `RESERVED` are reserved for later use and should be 0 and `NULL` respectively.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

```
-- Function: int gpgme_trust_item_get_int_attr
(gpgme_trust_item_t ITEM, gpgme_attr_t WHAT,
const void *RESERVED, int IDX)
```

The function `gpgme_trust_item_get_int_attr` returns the value of the number-representable attribute `WHAT` of trust item `ITEM`. If the attribute occurs more than once in the trust item, the index is specified by `IDX`. However, currently no such attribute exists, so `IDX` should be 0. The argument `RESERVED` is reserved for later use and should be `NULL`.

The function returns 0 if the attribute can't be returned as a number, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

```
-- Data type: enum gpgme_sig_stat_t
```

The `gpgme_sig_stat_t` type holds the result of a signature check, or the combined result of all signatures. The following results are possible:

`GPGME_SIG_STAT_NONE`

This status should not occur in normal operation.

`GPGME_SIG_STAT_GOOD`

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

#### GPGME\_SIG\_STAT\_GOOD\_EXP

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

#### GPGME\_SIG\_STAT\_GOOD\_EXPKEY

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

#### GPGME\_SIG\_STAT\_BAD

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

#### GPGME\_SIG\_STAT\_NOKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

#### GPGME\_SIG\_STAT\_NOSIG

This status indicates that the signature data provided was not a real signature.

#### GPGME\_SIG\_STAT\_ERROR

This status indicates that there was some other error which prevented the signature verification.

#### GPGME\_SIG\_STAT\_DIFF

For the combined result this status means that at least two signatures have a different status. You can get each keys status with `gpgme_get_sig_status`.

-- Function: `const char * gpgme_get_sig_status (gpgme_ctx_t CTX, int IDX, gpgme_sig_stat_t *R_STAT, time_t *R_CREATED)`

The function `gpgme_get_sig_status` is equivalent to:

```
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;
```

```

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
    return NULL;

if (r_stat)
{
    switch (gpg_err_code (sig->status))
    {
case GPG_ERR_NO_ERROR:
    *r_stat = GPGME_SIG_STAT_GOOD;
    break;

case GPG_ERR_BAD_SIGNATURE:
    *r_stat = GPGME_SIG_STAT_BAD;
    break;

case GPG_ERR_NO_PUBKEY:
    *r_stat = GPGME_SIG_STAT_NOKEY;
    break;

case GPG_ERR_NO_DATA:
    *r_stat = GPGME_SIG_STAT_NOSIG;
    break;

case GPG_ERR_SIG_EXPIRED:
    *r_stat = GPGME_SIG_STAT_GOOD_EXP;
    break;

case GPG_ERR_KEY_EXPIRED:
    *r_stat = GPGME_SIG_STAT_GOOD_EXPKEY;
    break;

default:
    *r_stat = GPGME_SIG_STAT_ERROR;
    break;
    }
}
if (r_created)
    *r_created = sig->timestamp;
return sig->fpr;

```

```

-- Function: const char * gpgme_get_sig_string_attr (gpgme_ctx_t CTX,
int IDX, gpgme_attr_t WHAT, int WHATIDX)

```

The function `gpgme_get_sig_string_attr` is equivalent to:

```
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
    return NULL;

switch (what)
{
    case GPGME_ATTR_FPR:
        return sig->fpr;

    case GPGME_ATTR_ERRTOK:
        if (whatidx == 1)
            return sig->wrong_key_usage ? "Wrong_Key_Usage" : "";
        else
            return "";
        default:
            break;
}

return NULL;
```

-- Function: `const char * gpgme_get_sig_ulong_attr (gpgme_ctx_t CTX,  
int IDX, gpgme_attr_t WHAT, int WHATIDX)`

The function `gpgme_get_sig_ulong_attr` is equivalent to:

```
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
```

```

return 0;

switch (what)
{
case GPGME_ATTR_CREATED:
    return sig->timestamp;

case GPGME_ATTR_EXPIRE:
    return sig->exp_timestamp;

case GPGME_ATTR_VALIDITY:
    return (unsigned long) sig->validity;

case GPGME_ATTR_SIG_STATUS:
    switch (sig->status)
    {
case GPG_ERR_NO_ERROR:
    return GPGME_SIG_STAT_GOOD;

case GPG_ERR_BAD_SIGNATURE:
    return GPGME_SIG_STAT_BAD;

case GPG_ERR_NO_PUBKEY:
    return GPGME_SIG_STAT_NOKEY;

case GPG_ERR_NO_DATA:
    return GPGME_SIG_STAT_NOSIG;

case GPG_ERR_SIG_EXPIRED:
    return GPGME_SIG_STAT_GOOD_EXP;

case GPG_ERR_KEY_EXPIRED:
    return GPGME_SIG_STAT_GOOD_EXPKEY;

default:
    return GPGME_SIG_STAT_ERROR;
    }

case GPGME_ATTR_SIG_SUMMARY:
    return sig->summary;

default:
    break;
    }
return 0;

```

```

-- Function: const char * gpgme_get_sig_key (gpgme_ctx_t CTX, int IDX,
gpgme_key_t *R_KEY)

```

The function `gpgme_get_sig_key` is equivalent to:

```
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
    return gpg_error (GPG_ERR_EOF);

return gpgme_get_key (ctx, sig->fpr, r_key, 0);
```

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#### GNU Lesser General Public License

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Version 2.1, February 1999

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=====

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Version 3, 29 June 2007

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| * gpgme_get_pinentry_mode:   | Pinentry Mode. (line 18)                |
| * gpgme_get_progress_cb:     | Progress Meter Callback.<br>(line 31)   |
| * gpgme_get_protocol:        | Protocol Selection. (line 21)           |
| * gpgme_get_protocol_name:   | Protocols and Engines.<br>(line 58)     |
| * gpgme_get_sender:          | Setting the Sender. (line 29)           |
| * gpgme_get_sig_key:         | Deprecated Functions.<br>(line 641)     |
| * gpgme_get_sig_status:      | Deprecated Functions.<br>(line 489)     |
| * gpgme_get_sig_string_attr: | Deprecated Functions.<br>(line 545)     |
| * gpgme_get_sig_ulong_attr:  | Deprecated Functions.<br>(line 579)     |
| * gpgme_get_status_cb:       | Status Message Callback.<br>(line 31)   |
| * gpgme_get_textmode:        | Text Mode. (line 20)                    |
| * gpgme_hash_algo_name:      | Hash Algorithms. (line 30)              |
| * gpgme_hash_algo_t:         | Hash Algorithms. (line 10)              |
| * gpgme_import_result_t:     | Importing Keys. (line 118)              |
| * gpgme_import_status_t:     | Importing Keys. (line 80)               |
| * gpgme_interact_cb_t:       | Advanced Key Editing.<br>(line 11)      |
| * gpgme_invalid_key_t:       | Crypto Operations. (line 10)            |
| * gpgme_io_cb_t:             | I/O Callback Interface.<br>(line 7)     |
| * gpgme_keylist_result_t:    | Listing Keys. (line 155)                |
| * gpgme_key_get_string_attr: | Deprecated Functions.                   |



|                                     |                                       |
|-------------------------------------|---------------------------------------|
| * gpgme_op_encrypt_ext:             | Encrypting a Plaintext.<br>(line 131) |
| * gpgme_op_encrypt_ext_start:       | Encrypting a Plaintext.<br>(line 224) |
| * gpgme_op_encrypt_result:          | Encrypting a Plaintext.<br>(line 252) |
| * gpgme_op_encrypt_sign:            | Encrypting a Plaintext.<br>(line 263) |
| * gpgme_op_encrypt_sign_ext:        | Encrypting a Plaintext.<br>(line 288) |
| * gpgme_op_encrypt_sign_ext_start:  | Encrypting a Plaintext.<br>(line 304) |
| * gpgme_op_encrypt_sign_start:      | Encrypting a Plaintext.<br>(line 274) |
| * gpgme_op_encrypt_start:           | Encrypting a Plaintext.<br>(line 113) |
| * gpgme_op_export:                  | Exporting Keys. (line 50)             |
| * gpgme_op_export_ext:              | Exporting Keys. (line 83)             |
| * gpgme_op_export_ext_start:        | Exporting Keys. (line 105)            |
| * gpgme_op_export_keys:             | Exporting Keys. (line 117)            |
| * gpgme_op_export_keys_start:       | Exporting Keys. (line 144)            |
| * gpgme_op_export_start:            | Exporting Keys. (line 71)             |
| * gpgme_op_genkey:                  | Generating Keys. (line 304)           |
| * gpgme_op_genkey_result:           | Generating Keys. (line 418)           |
| * gpgme_op_genkey_start:            | Generating Keys. (line 369)           |
| * gpgme_op_getauditlog:             | Additional Logs. (line 9)             |
| * gpgme_op_getauditlog_start:       | Additional Logs. (line 54)            |
| * gpgme_op_import:                  | Importing Keys. (line 9)              |
| * gpgme_op_import_ext:              | Deprecated Functions.<br>(line 22)    |
| * gpgme_op_import_keys:             | Importing Keys. (line 35)             |
| * gpgme_op_import_keys_start:       | Importing Keys. (line 65)             |
| * gpgme_op_import_result:           | Importing Keys. (line 174)            |
| * gpgme_op_import_start:            | Importing Keys. (line 24)             |
| * gpgme_op_interact:                | Advanced Key Editing.<br>(line 23)    |
| * gpgme_op_interact_start:          | Advanced Key Editing.<br>(line 53)    |
| * gpgme_op_keylist_end:             | Listing Keys. (line 111)              |
| * gpgme_op_keylist_ext_start:       | Listing Keys. (line 34)               |
| * gpgme_op_keylist_from_data_start: | Listing Keys. (line 67)               |
| * gpgme_op_keylist_next:            | Listing Keys. (line 94)               |
| * gpgme_op_keylist_result:          | Listing Keys. (line 166)              |
| * gpgme_op_keylist_start:           | Listing Keys. (line 6)                |
| * gpgme_op_keysign:                 | Signing Keys. (line 12)               |
| * gpgme_op_keysign_start:           | Signing Keys. (line 73)               |
| * gpgme_op_passwd:                  | Changing Passphrases.<br>(line 6)     |

|                                |                                      |
|--------------------------------|--------------------------------------|
| * gpgme_op_passwd_start:       | Changing Passphrases.<br>(line 21)   |
| * gpgme_op_query_swdb:         | Checking for updates.<br>(line 68)   |
| * gpgme_op_query_swdb_result:  | Checking for updates.<br>(line 80)   |
| * gpgme_op_revuid:             | Generating Keys. (line 224)          |
| * gpgme_op_revuid_start:       | Generating Keys. (line 252)          |
| * gpgme_op_set_uid_flag_start: | Generating Keys. (line 293)          |
| * gpgme_op_set_ui_flag:        | Generating Keys. (line 261)          |
| * gpgme_op_sign:               | Creating a Signature.<br>(line 21)   |
| * gpgme_op_sign_result:        | Creating a Signature.<br>(line 99)   |
| * gpgme_op_sign_start:         | Creating a Signature.<br>(line 47)   |
| * gpgme_op_spawn:              | Running other Programs.<br>(line 13) |
| * gpgme_op_spawn_start:        | Running other Programs.<br>(line 45) |
| * gpgme_op_tofu_policy:        | Changing TOFU Data. (line 29)        |
| * gpgme_op_tofu_policy_start:  | Changing TOFU Data. (line 43)        |
| * gpgme_op_trustlist_end:      | Listing Trust Items. (line 44)       |
| * gpgme_op_trustlist_next:     | Listing Trust Items. (line 27)       |
| * gpgme_op_trustlist_start:    | Listing Trust Items. (line 6)        |
| * gpgme_op_verify:             | Verify. (line 6)                     |
| * gpgme_op_verify_result:      | Verify. (line 290)                   |
| * gpgme_op_verify_start:       | Verify. (line 26)                    |
| * gpgme_passphrase_cb_t:       | Passphrase Callback. (line 10)       |
| * gpgme_pinentry_mode_t:       | Pinentry Mode. (line 26)             |
| * gpgme_progress_cb_t:         | Progress Meter Callback.<br>(line 8) |
| * gpgme_protocol_t:            | Protocols and Engines.<br>(line 17)  |
| * gpgme_protocol_t <1>:        | Engine Information. (line 7)         |
| * gpgme_pubkey_algo_name:      | Public Key Algorithms.<br>(line 58)  |
| * gpgme_pubkey_algo_string:    | Public Key Algorithms.<br>(line 68)  |
| * gpgme_pubkey_algo_t:         | Public Key Algorithms.<br>(line 10)  |
| * gpgme_query_swdb_result_t:   | Checking for updates.<br>(line 11)   |
| * gpgme_recipient_t:           | Decrypt. (line 75)                   |
| * gpgme_register_io_cb_t:      | I/O Callback Interface.<br>(line 23) |
| * gpgme_release:               | Destroying Contexts. (line 6)        |
| * gpgme_result_ref:            | Result Management. (line 15)         |

|                             |   |
|-----------------------------|---|
| * gpgme_result_unref:       | Result Management. (line 23)            |
| * gpgme_set_armor:          | ASCII Armor. (line 6)                   |
| * gpgme_set_ctx_flag:       | Context Flags. (line 6)                 |
| * gpgme_set_engine_info:    | Engine Configuration.<br>(line 11)      |
| * gpgme_set_global_flag:    | Library Version Check.<br>(line 44)     |
| * gpgme_set_include_certs:  | Included Certificates.<br>(line 6)      |
| * gpgme_set_io_cbs:         | Registering I/O Callbacks.<br>(line 35) |
| * gpgme_set_keylist_mode:   | Key Listing Mode. (line 6)              |
| * gpgme_set_locale:         | Locale. (line 14)                       |
| * gpgme_set_offline:        | Offline Mode. (line 6)                  |
| * gpgme_set_passphrase_cb:  | Passphrase Callback. (line 40)          |
| * gpgme_set_pintentry_mode: | Pintentry Mode. (line 6)                |
| * gpgme_set_progress_cb:    | Progress Meter Callback.<br>(line 16)   |
| * gpgme_set_protocol:       | Protocol Selection. (line 6)            |
| * gpgme_set_sender:         | Setting the Sender. (line 13)           |
| * gpgme_set_status_cb:      | Status Message Callback.<br>(line 17)   |
| * gpgme_set_textmode:       | Text Mode. (line 6)                     |
| * gpgme_signature_t:        | Verify. (line 92)                       |
| * gpgme_signers_add:        | Selecting Signers. (line 18)            |
| * gpgme_signers_clear:      | Selecting Signers. (line 11)            |
| * gpgme_signers_count:      | Selecting Signers. (line 25)            |
| * gpgme_signers_enum:       | Selecting Signers. (line 31)            |
| * gpgme_sign_result_t:      | Creating a Signature.<br>(line 85)      |
| * gpgme_sig_mode_t:         | Creating a Signature.<br>(line 7)       |
| * gpgme_sig_notation_add:   | Signature Notation Data.<br>(line 19)   |
| * gpgme_sig_notation_clear: | Signature Notation Data.<br>(line 10)   |
| * gpgme_sig_notation_get:   | Signature Notation Data.<br>(line 45)   |
| * gpgme_sig_notation_t:     | Verify. (line 38)                       |
| * gpgme_sig_stat_t:         | Deprecated Functions.<br>(line 442)     |
| * gpgme_ssize_t:            | Exchanging Data. (line 32)              |
| * gpgme_status_cb_t:        | Status Message Callback.<br>(line 8)    |
| * gpgme_strerror:           | Error Strings. (line 6)                 |
| * gpgme_strerror_r:         | Error Strings. (line 15)                |
| * gpgme_strerror:           | Error Strings. (line 26)                |
| * gpgme_subkey_t:           | Key objects. (line 112)                 |

- \* `gpgme_tofu_info_t`: Key objects. (line 275)
- \* `gpgme_tofu_policy_t`: Changing TOFU Data. (line 13)
- \* `gpgme_trust_item_get_int_attr`: Deprecated Functions.  
(line 426)
- \* `gpgme_trust_item_get_string_attr`: Deprecated Functions.  
(line 411)
- \* `gpgme_trust_item_ref`: Manipulating Trust Items.  
(line 6)
- \* `gpgme_trust_item_release`: Deprecated Functions.  
(line 18)
- \* `gpgme_trust_item_t`: Trust Item Management.  
(line 8)
- \* `gpgme_trust_item_unref`: Manipulating Trust Items.  
(line 10)
- \* `gpgme_user_id_t`: Key objects. (line 217)
- \* `gpgme_validity_t`: Information About Keys.  
(line 9)
- \* `gpgme_verify_result_t`: Verify. (line 268)
- \* `gpgme_wait`: Waiting For Completion.  
(line 6)
- \* `IMPORT_FILES`: UI Server Import/Export Keys.  
(line 9)
- \* `INPUT`: UI Server Encrypt. (line 23)
- \* `INPUT <1>`: UI Server Sign. (line 12)
- \* `INPUT <2>`: UI Server Decrypt. (line 12)
- \* `INPUT <3>`: UI Server Verify. (line 16)
- \* `MESSAGE`: UI Server Verify. (line 10)
- \* `MICALG`: UI Server Sign. (line 43)
- \* `off_t (*gpgme_data_seek_cb_t) (void *HANDLE, off_t OFFSET, int WHENCE)`: Callback Based Data Buffers.  
(line 43)
- \* `OUTPUT`: UI Server Encrypt. (line 36)
- \* `OUTPUT <1>`: UI Server Sign. (line 18)
- \* `OUTPUT <2>`: UI Server Decrypt. (line 19)
- \* `OUTPUT <3>`: UI Server Verify. (line 23)
- \* `PREP_ENCRYPT`: UI Server Encrypt. (line 72)
- \* `PROTOCOL`: UI Server Encrypt. (line 98)
- \* `RECIPIENT`: UI Server Encrypt. (line 9)
- \* `SENDER`: Miscellaneous UI Server Commands.  
(line 50)
- \* `SESSION`: Miscellaneous UI Server Commands.  
(line 69)
- \* `SIGN`: UI Server Sign. (line 33)
- \* `SIGN_FILES`: UI Server Sign/Encrypt Files.  
(line 10)
- \* `SIGSTATUS`: UI Server Verify. (line 56)
- \* `ssize_t (*gpgme_data_read_cb_t) (void *HANDLE, void *BUFFER, size_t SIZE)`: Callback Based Data Buffers.  
(line 10)
- \* `ssize_t (*gpgme_data_write_cb_t) (void *HANDLE, const void *BUFFER, size_t SIZE)`: Callback Based Data

Buffers.

(line 27)

\* START\_CONFDialog: Miscellaneous UI Server Commands.  
(line 41)

\* START\_KEYMANAGER: Miscellaneous UI Server Commands.  
(line 31)

\* struct gpgme\_data\_cbs: Callback Based Data Buffers.  
(line 59)

\* struct gpgme\_io\_cbs: Registering I/O Callbacks.  
(line 6)

\* VERIFY: UI Server Verify. (line 31)

\* VERIFY\_FILES: UI Server Verify/Decrypt Files.  
(line 10)

\* void (\*gpgme\_data\_release\_cb\_t) (void \*HANDLE): Callback Based Data Buffers.  
(line 54)

\* void (\*gpgme\_event\_io\_cb\_t) (void \*DATA, gpgme\_event\_io\_t TYPE, void \*TYPE\_DATA): I/O Callback Interface.  
(line 89)

\* void (\*gpgme\_progress\_cb\_t)(void \*HOOK, const char \*WHAT, int TYPE, int CURRENT, int TOTAL): Progress Meter Callback.  
(line 6)

\* void (\*gpgme\_remove\_io\_cb\_t) (void \*TAG): I/O Callback Interface.  
(line 48)

\* window-id: Miscellaneous UI Server Commands.  
(line 21)

# \*- mode: org \*-

#+TITLE: Maintenance Mode

#+AUTHOR: Ben McGinnes

#+LATEX\_COMPILER: xelatex

#+LATEX\_CLASS: article

#+LATEX\_CLASS\_OPTIONS: [12pt]

#+LATEX\_HEADER: \usepackage{xltextra}

#+LATEX\_HEADER: \usepackage[margin=1in]{geometry}

#+LATEX\_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}

#+LATEX\_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

\* Maintenance Mode from 2019

:PROPERTIES:

:CUSTOM\_ID: maintenance-mode

:END:

| Version: | 0.0.1 |

| GPGME Version: | 1.13.0 |

| Author: | Ben McGinnes <ben@gnupg.org> |

| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |

| Language: | Australian English, British English |

| xml:lang: | en-AU, en-GB, en |

From the beginning of 2019 the Python bindings to GPGME will enter maintenance mode, meaning that new features will not be added and only bug fixes and security fixes will be made. This also means that documentation beyond that existing at the end of 2018 will not be developed further except to correct errors.

Though use of these bindings appears to have been quite well received, there has been no indication of what demand there is, if any for either financial backing of the current Python bindings development or support contracts with g10code GmbH citing the necessity of including the bindings.

```
** Maintainer from 2019 onward
:PROPERTIES:
:CUSTOM_ID: maintenance-mode-bm
:END:
```

How does this affect the position of GnuPG Python Bindings Maintainer?

Well, I will remain as maintainer of the bindings; but without funding for that position, the amount of time I will be able to dedicate solely to this task will be limited and reduced to volunteered time. As with all volunteered time and effort in free software projects, this will be subject to numerous external imperatives.

```
** Using the Python Bindings from 2019 and beyond
:PROPERTIES:
:CUSTOM_ID: maintenance-mode-blade-runner
:END:
```

For most, if not all, Python developers using these bindings; they will continue to just work the same as they always have. Expansions of GPGME itself are usually handled by SWIG with the existing code and thus bindings are generated properly when the bindings are installed alongside GPGME and when the latter is built from source.

In the rare circumstances where that is not enough to address some new addition to GPGME, then that is a bug and thus subject to the maintenance mode provisions (i.e. it will be fixed following a bug report being raised and your humble author will need to remember where the timesheet template was filed, depending on how many years off such an event is).

All the GPGME functionality will continue to be accessible via the lower level, dynamically generated methods which match the GPGME C

documentation. While the more intuitively Pythonic higher level layer already covers the vast majority of functionality people require with key generation, signatures, certifications (key signing), encryption, decryption, verification, validation, trust levels and so on.

Any wanted features lacking in the Python bindings are usually lacking because they are missing from GPGME itself (e.g. revoking keys via the API) and in such cases they are usually deliberately excluded. More discussion of these issues can be found in the archives of the [\[https://lists.gnupg.org/mailman/listinfo/gnupg-devel\]](https://lists.gnupg.org/mailman/listinfo/gnupg-devel) [gnupg-devel mailing list].

Any features existing in the dynamically generated layer for which people want a specific, higher level function included to make it more Pythonic (e.g. to avoid needing to learn or memorise cryptographic mode values or GnuPG status code numbers), would be a feature request and /not/ a bug.

It is still worthwhile requesting it, but the addition of such a feature would not be guaranteed and provided on a purely volunteer basis. Expediting such a request would require funding that request.

Those with a commercial interest in expediting such a feature request already know how to [\[https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset\]](https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset) [expedite it] (use the message field to state what feature is being requested).

\*\* Documentation formats

```
:PROPERTIES:  
:CUSTOM_ID: docs  
:END:
```

The documentation has been written in Org mode for GNU Emacs, with both Texinfo and reStructuredText formats generated from that. The Texinfo files are intended for use with the rest of the GnuPG documentation; while the reStructuredText files are intended for use with Docutils and Sphinx, as with other Python projects.

\*\*\* Cautionary Notes regarding Sphinx and EPUB

```
:PROPERTIES:  
:CUSTOM_ID: sphinx-made-epubs-suck  
:END:
```

Though Python's Docutils in conjunction with Sphinx is capable of generating some very useful HTML sites, as proven by [\[https://readthedocs.org/\]](https://readthedocs.org/) [Read the Docs] and the [\[https://docs.python.org/\]](https://docs.python.org/) [Python documentation], there are a number of output formats it does not handle well. At the top of the list of things it manages to break

so atrociously as to be embarrassing is the [\[\[http://idpf.org/epub\]\]](http://idpf.org/epub)[EPUB 3] format.

The automatically generated EPUB of the CPython documentation always contains hundreds of validation errors and even the modest amount of documentation here [\[\[https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub\]\]](https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub)[produced a file] with approximately thirty validation errors. As the volume of documentation content increases, so does the induced errors. Whereas Texinfo doesn't produce EPUB output at all, nor does Org-mode.

Should there ever be genuine demand for this format, lodge a [\[\[https://dev.gnupg.org/maniphest/task/edit/form/4/\]\]](https://dev.gnupg.org/maniphest/task/edit/form/4/)[feature request] case marked for [\[\[https://dev.gnupg.org/p/BenM/\]\]](https://dev.gnupg.org/p/BenM/)[my] attention. The means of generating such files flawlessly is already available, but is not yet part of the GnuPG build system. Nor is it integrated with a means of converting Org mode input files to the relevant base format automatically, as can already be done when converting Org to reStructuredText or Org to Texinfo. As a certain amount of work would be required to get it done, there would need to be clear demand for that work to be done.  
2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-05-11 Marcus Brinkmann <marcus@g10code.com>

\* gpgsm/Makefile.am (DISTCLEANFILES): Move to ...  
(CLEANFILES): ... here.  
(clean-local): New rule.  
\* gpg/Makefile.am (DISTCLEANFILES): Move to ...  
(CLEANFILES): ... here.

2011-05-05 Marcus Brinkmann <marcus@g10code.com>

\* gpg/Makefile.am: Unset GPG\_AGENT\_INFO when setting up local configuration.  
(clean-local): Shut down local gpg-agent.

2011-05-04 Marcus Brinkmann <marcus@g10code.com>

\* gpg/t-import.c (check\_result): Complete secret key pair counting and disable status check, as GPG 2.1 currently emits two IMPORT\_OK lines and we only look at the first.

2011-04-27 Marcus Brinkmann <marcus@g10code.com>

\* gpg/Makefile.am (DISTCLEANFILES): Add S.gpg-agent.  
(mkdemodirs, ./Alpha/Secret.gpg): Remove targets.  
(GNUPGHOME): Export as absolute build directory (for gpg-agent).  
(./pubring.gpg): Remove --homedir option, import secdemo.asc.  
(clean-local): Rewrite.  
\* gpg/secdemo.asc: New file.  
\* gpg/pubkey-1.asc, gpg/seckey-1.asc: Change passphrase to "abc" (now needed as GnuPG 2.1 asks for secret key passphrase on import).  
\* gpg/t-keylist.c (keys): Update key info for Joe Random Hacker.  
(main): Disable check for can\_encrypt, as this is now in a different subkey.  
\* gpg/t-encrypt-sign.c (check\_result): Allow RMD160 hash algorithm.  
\* gpg/t-import.c (check\_result): One secret key pair now counts as two secret keys, allow that.

2009-11-03 Werner Koch <wk@g10code.com>

\* run-support.h (fail\_if\_err): Include program name.  
\* run-sign.c (main): Add option --uiserver.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

\* opassuan/t-command.c: Update to new interface.

2009-10-15 Werner Koch <wk@g10code.com>

\* run-verify.c: New.

2009-08-06 Werner Koch <wk@g10code.com>

\* run-sign.c: New.

2009-07-07 Werner Koch <wk@g10code.com>

\* run-keylist.c (main): Add options --cms and --openpgp.  
\* gpg/pgp-keylist.c: Rename to ...  
\* run-keylist.c: ... this.  
\* gpg/pgp-import.c: Rename to ...  
\* run-import.c: ... this.  
\* gpg/pgp-export.c: Rename to ...  
\* run-export.c: ... this.  
\* run-support.h: New. Copied from gpg/t-support.h.  
\* gpg/Makefile.am (noinst\_PROGRAMS): Remove them.  
\* Makefile.am (noinst\_PROGRAMS): Add them.

(noinst\_HEADERS): New.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-support.h (passphrase\_cb): Implement write() according to the book to silence compiler warning.

\* gpgsm/t-support.h (passphrase\_cb): Likewise.

2009-06-16 Werner Koch <wk@g10code.com>

\* gpg/pgp-import.c: New.

\* gpg/t-support.h (print\_import\_result, nonnull): Factored out from other tools.

\* gpg/pgp-export.c, gpg/pgp-keylist.c: New.

2009-06-09 Werner Koch <wk@g10code.com>

\* gpg/Makefile.am (./pubring.gpg): Ignore errors in case of already imported keys. Add --no-permission-warning and remove obsolete --allow-secret-key-import.

\* gpg/mkdemodirs.in (GPG): Add --no-permission-warning.

\* gpg/t-edit.c (edit\_fnc): Use gpgme\_io\_write.

2009-04-19 Moritz <moritz@gnu.org>

\* gpg/Makefile.am (EXTRA\_DIST): Replaced mkdemodirs with mkdemodirs.in. (mkdemodirs): New target.

(clean-local): Added command for removing mkdemodirs script.

(./Alpha/Secret.gpg): Added dependency on mkdemodirs.

\* gpg/mkdemodirs: Renamed to ...

\* gpg/mkdemodirs.in: ... here.

\* gpg/mkdemodirs.in (GPG): Derive value from @GPG@ instead of hard-coding "gpg".

2009-02-24 Werner Koch <wk@g10code.com>

\* opassuan/t-command.c: Adjust for changed new op\_assuan interface.

2009-02-03 Werner Koch <wk@g10code.com>

\* gpg/t-keylist.c (main): Check that new fields is\_cardkey and card\_number are not set.

2009-01-26 Werner Koch <wk@g10code.com>

- \* opassuan/: New.
- \* opassuan/Makefile.am: New.
- \* opassuan/t-command.c: New.

2008-12-03 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (INCLUDES): Fix path to include file.
- \* gpg/Makefile.am (INCLUDES), gpgsm/Makefile.am (INCLUDES): Likewise.

2008-11-18 Werner Koch <wk@g10code.com>

- \* gpgsm/cms-decrypt.c: New.

2008-11-03 Marcus Brinkmann <marcus@g10code.com>

- \* gpgsm/Makefile.am (INCLUDES, LDADD): Replace gpgme path with src.
- \* gpg/Makefile.am (INCLUDES, LDADD, t\_thread1\_LDADD): Likewise.
- \* Makefile.am (LDADD): Likewise.

2008-10-30 Werner Koch <wk@g10code.com>

- \* gpgsm/cms-keylist.c: New.

2008-06-19 Werner Koch <wk@g10code.com>

- \* gpg/t-gpgconf.c (dump\_arg): Add new types. Print strings in quotes.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (DISTCLEANFILES): Add pubring.kbx~.

2008-01-10 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-gpgconf.c (main): Allow for dirmngr not to be available.
- \* gpg/Makefile.am (./gpg-agent.conf): Correct pinentry path.
- \* gpg/pinentry: New file.
- \* gpg/Makefile.am (DISTCLEANFILES, all-local): Add gpg-agent.conf (./gpg-agent.conf): New target.
- (EXTRA\_DIST): Add pinentry.

- \* gpg/t-gpgconf.c (main): Exit early if compiled without gpgconf.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (CLEANFILES): Add pubring.kbx and dirmngr.conf.

\* Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.  
\* gpg/Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.  
\* gpgsm/Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.  
\* gpg/Makefile.am (TESTS): Add t-gpgconf.  
t-gpgconf.c: New file.

2007-11-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (show\_auditlog): Check for GPG\_ERR\_ASS\_UNKNOWN\_CMD.

2007-11-23 Werner Koch <wk@g10code.com>

\* gpgsm/t-verify.c (check\_result): Don't exit on error but set a flag.  
(main): Consult flag for return value.  
(show\_auditlog): New.  
(main): Use it.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* t-engine-info.c (check\_engine\_info): Fix debug output.  
\* gpg/Makefile.am (tests\_unix): New variable.  
(TESTS): Use it.  
\* gpg/t-support.h (passphrase\_cb) [HAVE\_W32\_SYSTEM]: Use WriteFile instead of write.  
\* gpg/t-wait.c [HAVE\_W32\_SYSTEM]: Define sleep as \_sleep.

2007-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (main): Release TEXT and SIG.

2007-07-12 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (key\_id): Change := into =.

2007-07-12 Werner Koch <wk@g10code.com>

\* gpgsm/t-support.h (init\_gpgme) [W32]: Do not init the locales as the constants are not available.

2007-02-26 Werner Koch <wk@g10code.com>

\* gpg/t-verify.c (double\_plaintext\_sig): New.  
(main): Check it.

2006-12-02 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (main): Skip unknown keys. Newer versions of GPGSM import more keys than older ones.

2005-12-06 Werner Koch <wk@g10code.com>

\* gpg/t-keylist.c (main): Changed for that secondary keys now have a fingerprint.

\* gpg/t-keylist-sig.c (main): Ditto.

\* gpgsm/t-keylist.c (main): Ditto. The test used to be wrong.

2005-10-18 Werner Koch <wk@g10code.com>

\* gpg/pubdemo.asc, gpg/secdemo.asc: Add 2 expired subkeys to Whisky.

\* gpg/t-keylist.c: Reordered list to match new demo keyring. Add arg for number of subkeys and for extra checking function.

(main): Enhanced a few error outputs. Changed subkey counting. Call extra checking function.

(check\_whisky): New.

2005-10-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (main): Allow for an email address as a second uid.

\* gpg/t-sig-notation.c: Change critical notation to something GnuPG understands.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (EXTRA\_DIST): Remove gpg.conf.

(DISTCLEANFILES): Add gpg.conf.

(all-local): Add gpg.conf.

(./gpg.conf): New target.

\* gpg/gpg.conf: Remove file.

\* gpg/Makefile.am (EXTRA\_DIST): Add gpg.conf.

\* gpg/Makefile.am (TESTS): Add t-sig-notation.

\* gpg/t-sig-notation.c (check\_result): New file.

\* gpg/t-verify.c (check\_result): Also check the length of the notation data.

\* gpg/gpg.conf: New file.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (TESTS): Add t-filename.

\* gpg/t-filename.c: New file.

2005-09-23 Werner Koch <wk@g10code.com>

\* gpg/t-support.h (init\_gpgme) [W32]: Don't use LC\_MESSAGES.

\* gpg/t-encrypt-large.c: New test.

\* gpg/Makefile.am (TESTS): Add t-encrypt-large.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (TESTS): Add t-wait.

\* gpg/t-wait.c (main): New test.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* gpg/mkdemodirs: Add copyright notice.

\* gpgsm/Makefile.am, gpgsm/t-support.h, gpgsm/t-decrypt.c,  
gpgsm/t-encrypt.c, gpgsm/t-export.c, gpgsm/t-genkey.c,  
gpgsm/t-import.c, gpgsm/t-keylist.c, gpgsm/t-sign.c,  
gpgsm/t-verify.c, gpg/Makefile.am, gpg/t-decrypt.c,  
gpg/t-decrypt-verify.c, gpg/t-edit.c, gpg/t-encrypt.c,  
gpg/t-encrypt-sign.c, gpg/t-encrypt-sym.c, gpg/t-eventloop.c,  
gpg/t-export.c, gpg/t-genkey.c, gpg/t-import.c, gpg/t-keylist.c,  
gpg/t-keylist-sig.c, gpg/t-sign.c, gpg/t-signers.c,  
gpg/t-support.h, gpg/t-thread1.c, gpg/t-trustlist.c,  
gpg/t-verify.c, Makefile.am, t-data.c, t-engine-info.c,  
t-version.c: Change license to LGPL.

2004-08-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (struct): Add new fields VALIDITY and  
KEY\_LENGTH.

(main): Use them.

\* gpgsm/t-import.c (check\_result): New argument total\_stat.

(main): Pass this argument. Reduce number of total considered  
keys to 1 for the second test.

2004-04-05 Werner Koch <wk@gnupg.org>

\* gpgsm/Makefile.am: Changed the faked system time to 20011213T12000.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c: Add chain IDs.

2004-03-03 Werner Koch <wk@gnupg.org>

\* gpgsm/t-export.c (main): Also check exporting 2 certificates.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgsm/t-import.c (check\_result): gpgsm does now return info in the result->imports; adjust for that.

\* gpgsm/Makefile.am (TESTS\_ENVIRONMENT): Reset the GPG\_AGENT\_INFO.

Include config.h at the top of each C source. This is required due to LFS support.

\* gpg/t-keylist-sig.c (main): s/class/sig\_class/.

\* gpg/t-signers.c (check\_result): Ditto.

\* gpg/t-sign.c (check\_result): Ditto.

\* gpg/t-encrypt-sign.c (check\_result): Ditto.

\* gpgsm/t-sign.c (check\_result): Ditto.

2004-01-12 Werner Koch <wk@gnupg.org>

\* gpg/t-keylist-sig.c (main): Temporary disabled one test due top gpg 1.3.4 problems.

\* gpg/t-import.c (check\_result): Likewise.

2003-11-19 Werner Koch <wk@gnupg.org>

\* gpg/t-support.h (DIM): Added.

\* gpg/t-verify.c (check\_result): Rewrote test for notations because the order of notations is not guaranteed.

\* gpgsm/t-support.h (fail\_if\_err): Also print the numeric values.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-eventloop.c: Include <sys/types.h> for old systems.

\* gpgsm/Makefile.am (DISTCLEANFILES): Add random\_seed.

\* gpg/t-thread1.c (thread\_one): Do not call initialize\_gpgme. Likewise.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-thread1.c (main): Call init\_gpgme here. (initialize\_gpgme): Function removed.

\* gpg/t-thread1.c: New file.  
\* gpg/Makefile.am (TESTS): Add t-thread1.c.  
(t\_thread1\_LDADD): New variable.  
(LDADD): Remove GPG Error lib.  
\* gpgsm/Makefile.am (LDADD): Likewise.

\* gpg/t-import.c (main): Likewise.  
\* gpg/t-keylist-sig.c (main): Likewise.  
\* gpg/t-keylist.c (main): Likewise.  
\* gpg/t-sign.c (main): Likewise.  
\* gpg/t-signers.c (main): Likewise.  
\* gpg/t-trustlist.c (main): Likewise.  
\* gpgsm/t-support.h: Include <stdlib.h> and <locale.h>.  
(init\_gpgme): New function.  
\* gpg/t-support.h: Likewise.  
\* gpgsm/t-verify.c (main): Call init\_gpgme.  
\* gpgsm/t-decrypt.c (main): Likewise.  
\* gpgsm/t-encrypt.c (main): Likewise.  
\* gpgsm/t-export.c (main): Likewise.  
\* gpgsm/t-genkey.c (main): Likewise.  
\* gpgsm/t-import.c (main): Likewise.  
\* gpgsm/t-keylist.c (main): Likewise.  
\* gpgsm/t-sign.c (main): Likewise.  
\* gpg/t-verify.c (main): Call init\_gpgme.  
\* gpg/t-decrypt-verify.c (main): Likewise.  
\* gpg/t-decrypt.c (main): Likewise.  
\* gpg/t-edit.c (main): Likewise.  
\* gpg/t-encrypt-sign.c (main): Likewise.  
\* gpg/t-encrypt-sym.c (main): Likewise.  
\* gpg/t-encrypt.c (main): Likewise.  
\* gpg/t-eventloop.c (main): Likewise.  
\* gpg/t-export.c (main): Likewise.  
\* gpg/t-genkey.c (main): Likewise.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-sign.c (check\_result): Change output format for signature class to unsigned int.  
\* gpg/t-signers.c (check\_result): Likewise.  
\* gpg/t-encrypt-sign.c (check\_result): Likewise.  
\* gpgsm/t-sign.c (check\_result): Likewise.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-verify.c (check\_result): Change type of SUMMARY to unsigned int.  
\* gpg/t-decrypt-verify.c (check\_verify\_result): Likewise.  
\* gpg/t-keylist-sig.c (keys): Change type of member CLASS to

unsigned int.

\* t-data.c (read\_cb): Change type of AMOUNT to unsigned int.

\* t-version.c (version): Remove unused variable.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (AM\_CPPFLAGS): New variable.

(LDADD): Add @GPG\_ERROR\_LIBS@.

\* gpg/Makefile.am (AM\_CPPFLAGS): New variable.

(LDADD): Add @GPG\_ERROR\_LIBS@.

\* gpgsm/Makefile.am (AM\_CPPFLAGS): New variable.

(LDADD): Add @GPG\_ERROR\_LIBS@.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

Everywhere: Use libgpg-error error codes.

\* gpg/Makefile.am (noinst\_HEADERS): New variable.

\* gpg/t-support.h: New file.

\* gpgsm/Makefile.am (noinst\_HEADERS): New variable.

\* gpgsm/t-support.h: New file.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sym.c (main): Adapt to new syntax.

\* gpg/t-encrypt.c (main): Likewise.

\* gpg/t-eventloop.c (main): Likewise.

\* gpg/t-encrypt-sign.c (main): Likewise.

\* gpgsm/t-export.c (main): Likewise.

\* gpgsm/t-encrypt.c (main): Likewise.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-eventloop.c (main): Rewrite recipient management.

\* gpg/t-encrypt-sign.c (main): Likewise.

\* gpg/t-encrypt.c (main): Likewise.

\* gpg/t-export.c (main): Likewise.

\* gpgsm/t-encrypt.c (main): Likewise.

\* gpgsm/t-export.c (main): Likewise.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (TESTS): Order t-keylist and t-keylist-sig after t-import.

\* gpg/t-edit.c (edit\_fnc): Fix primary UID for keylisting tests.

\* gpg/t-keylist.c: Change order of user IDs.

\* gpg/t-keylist-sig.c: Likewise.

\* gpg/t-import.c: Add support for gpg in CVS.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

- \* t-data.c: Remove TEST\_OUT\_CB.
- (main): Likewise.
- \* gpg/t-trustlist.c (main): Access ITEM directly.
  
- \* (t-decrypt-verify.c, t-decrypt.c, t-edit.c, t-encrypt-sign.c, t-encrypt-sym.c, t-sign.c, t-signers.c): Include <unistd.h>.
- (passphrase\_cb): Rewritten.
- \* t-edit.c (edit\_fnc): Rewritten.

2003-05-04 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-keylist-sig.c (main): Remove timestamp check.
  
- \* gpgsm/t-keylist.c: Add check for timestamp.
  
- \* gpg/Makefile.am (TESTS): Add t-keylist-sig.
- \* gpg/t-keylist-sig.c: New file.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-eventloop.c (main): Do not call print\_op\_info.
- (print\_op\_info): Function removed.
  
- \* gpg/t-keylist.c: Rewritten.
- \* gpgsm/t-keylist.c (main): Rewritten.
- \* gpg/t-edit.c (main): Do not use gpgme\_key\_get\_as\_xml. Use gpgme\_key\_unref instead gpgme\_key\_release.
- \* gpg/t-signers.c (main): Use gpgme\_key\_unref instead gpgme\_key\_release.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-trustlist.c: Rewritten.
  
- \* gpg/t-verify.c (main): Rewritten.
- \* gpg/t-decrypt-verify.c: Rewritten.
- \* gpgsm/t-verify.c (main): Rewritten.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-decrypt.c (main): Rewritten.
  
- \* gpg/t-decrypt.c: Rewritten.
  
- \* gpg/t-signers.c: Rewritten.

2003-04-27 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sign.c (check\_result): Rewritten.

\* gpg/t-sign.c: Rewritten.

\* gpgsm/t-sign.c: Rewritten.

\* gpg/t-encrypt.c: Check for invalid recipients.

\* gpgsm/t-encrypt.c: Likewise.

\* gpg/t-import.c (check\_result): Really use FPR.

\* gpgsm/t-import.c (check\_result): Rewritten.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-import.c: Rewritten.

\* gpgsm/t-genkey.c: Rewritten.

\* gpgsm/Makefile.am (noinst\_PROGRAMS): Add t-genkey.

\* gpg/t-genkey.c: Include <stdlib.h>.

(main): Check result->fpr before checking its length.

2003-04-24 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-genkey.c: Rewritten to match new semantics.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt.c (passphrase\_cb): Fix to new prototype.

\* gpg/t-decrypt-verify.c (passphrase\_cb): Likewise.

\* gpg/t-edit.c (passphrase\_cb): Likewise.

\* gpg/t-encrypt-sign.c (passphrase\_cb): Likewise.

\* gpg/t-encrypt-sym.c (passphrase\_cb): Likewise.

\* gpg/t-sign.c (passphrase\_cb): Likewise.

\* gpg/t-signers.c (passphrase\_cb): Likewise.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* t-engine-info.c: Use file\_name instead path throughout.

\* Makefile.am (TESTS): Add t-engine-info.

\* t-engine-info.c: New file.

\* gpg/t-encrypt.c (main): Don't print engine info.

\* gpg/t-eventloop.c (main): Likewise.

\* gpg/t-encrypt-sign.c (main): Likewise.

\* gpgsm/t-encrypt.c (main): Likewise.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (main): Adjust caller of gpgme\_op\_verify.  
\* gpg/t-verify.c (main): Likewise.  
\* gpg/t-decrypt-verify.c (main): Likewise for  
gpgme\_op\_decrypt\_verify.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./gpgsm.conf): Add a faked system time to  
avoid certification's expiry.  
\* gpgsm/t-encrypt.c (main): Use the short certification name.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-genkey.c (main): Add missing argument to gpgme\_op\_genkey  
invocation.

2002-10-09 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt.c (print\_data): Update to new gpgme\_data\_read  
interface, and use gpgme\_engine\_check\_version instead  
gpgme\_check\_version.  
\* gpg/t-decrypt-verify.c (print\_data): Likewise.  
\* gpg/t-edit.c (main): Likewise.  
\* gpg/t-encrypt.c (print\_data): Likewise.  
\* gpg/t-encrypt-sign.c (print\_data): Likewise.  
\* gpg/t-encrypt-sym.c (print\_data): Likewise.  
\* gpg/t-eventloop.c (print\_data): Likewise.  
\* gpg/t-export.c (print\_data): Likewise.  
\* gpg/t-sign.c (print\_data): Likewise.  
\* gpg/t-signers.c (print\_data): Likewise.  
\* gpgsm/t-decrypt.c (print\_data): Likewise.  
\* gpgsm/t-encrypt.c (print\_data): Likewise.  
\* gpgsm/t-export.c (print\_data): Likewise.  
\* gpgsm/t-sign.c (print\_data): Likewise.  
\* gpg/t-verify.c (main): Likewise for gpgme\_op\_verify.  
\* gpgsm/t-verify.c (main): Likewise for gpgme\_op\_verify.  
\* t-data.c (read\_once\_test): Likewise.  
(write\_test): Update for new behaviour of data objects.  
(main): Remove type test.

2002-09-30 Werner Koch <wk@gnupg.org>

\* gpgsm/t-keylist.c (doit): Add arg SECRET.  
(main): Add option --secret.

2002-09-28 Marcus Brinkmann <marcus@g10code.de>

\* t-version.c: Include <string.h>. Reported by Stphane Corthsy.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-keylist.c (main): Test PATTERN for NULL before printing.  
Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-08-01 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-edit.c: Also add a test for the expire command (testing  
the passphrase callback).

2002-07-28 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-edit.c: New file.  
\* gpg/Makefile (TESTS): Add t-edit.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sym.c (main): Change type of I to size\_t and  
rename to LEN.  
\* gpg/t-verify.c (main): Likewise. Submitted by Stphane  
Corthsy.

2002-07-03 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-eventloop.c: New file.  
\* gpg/Makefile (TESTS): Add t-eventloop.

2002-06-26 Werner Koch <wk@gnupg.org>

\* gpgsm/t-import.c (print\_op\_info): New.  
(main): Print operation info.

2002-06-25 Werner Koch <wk@gnupg.org>

\* gpgsm/Makefile.am (DISTCLEANFILES): new.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (TESTS): Add t-export.  
gpgsm/t-export.c: New file.

2002-06-20 Werner Koch <wk@gnupg.org>

\* gpgsm/t-sign.c (main): Also test a normal signature.

\* gpg/Makefile (TESTS\_ENVIRONMENT): Set GPG\_AGENT\_INFO empty.

\* gpg/t-signers.c, gpg/t-sign.c, gpg/t-encrypt-sym.c  
\* gpg/t-encrypt-sign.c, gpg/t-decrypt.c  
\* gpg/t-decrypt-verify.c (main): Changed the GPG\_AGENT\_INFO check to match the one in ../../gpgme/rungpg.c.

2002-06-12 Werner Koch <wk@gnupg.org>

\* gpgsm/t-keylist.c (doit): Print operation info if available.

2002-06-10 Werner Koch <wk@gnupg.org>

\* gpgsm/t-verify.c (print\_sig\_stat): Print the error token.

2002-06-04 Werner Koch <wk@gnupg.org>

\* gpgsm/t-encrypt.c (main): Add a simple option parser and allow to specify an encryption key.

2002-05-26 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (all-local): Remove dependency on ./secring.gpg.  
(./secring.gpg): Remove target, and move all rules for this target to ...  
(./pubring.gpg): ... here. This was necessary because GnuPG 1.0.7 does create an empty secring.gpg file when importing public keys.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (validity\_string): New.  
(print\_sig\_stat): Print expire time and validity.  
(status\_string): Add new expired stati.

2002-05-03 Werner Koch <wk@gnupg.org>

\* gpg/t-verify.c (validity\_string): New.  
(print\_sig\_stat): Print expire time and validity.  
(status\_string): Add new expired stati.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./trustlist.txt): Put more into this file to prevent use of gpg-agent.  
(./gpg-agent.conf): Remove target.  
(all-local): Remove ./gpg-agent.conf.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (main): Use gpgme\_engine\_check\_version instead

gpgme\_check\_engine.

\* gpgsm/t-encrypt.c (main): Likewise.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sym.c: New file.

\* gpg/Makefile.am (TESTS): Add t-encrypt-sym.

2002-03-05 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (CLEANFILES): Remove random\_seed, which is now in DISTCLEANFILES.

2002-03-04 Werner Koch <wk@gnupg.org>

\* gpg/Makefile.am (DISTCLEANFILES): Added.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-verify.c (main): Add a few more sanity checks, and a check for normal signatures.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sign.c: New file.

\* gpg/Makefile.am (TESTS): Add t-encrypt-sign.

2002-02-13 Werner Koch <wk@gnupg.org>

\* gpgsm/Makefile.am (private-keys-v1.d): Don't fail when the directory already exists.

2002-02-12 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (CLEANFILES): New target.

(distclean-local): Rename to ...

(clean-local): ... this.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./private-keys-v1.d/\$(key\_id).key): Fix rule.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-genkey.c: New file (not added to Makefile.am because of gpg-agent bug).

2002-02-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (key\_id): Update value.  
(all-local): Add .key to keyid filename.  
(./private-keys-v1.d/\$(key\_id)): Renamed to ...  
(./private-keys-v1.d/\$(key\_id).key): ... this.  
(all-local): Add ./gpgsm.conf, ./trustlist.txt.  
(./gpgsm.conf, ./trustlist.txt): New target.  
\* gpgsm/567064FE6D14A17B2D811ABB407728BC558AA455: Renamed to ...  
\* gpgsm/32100C27173EF6E9C4E9A25D3D69F86D37A4F939: ... this.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-import.c (print\_op\_info): New function.  
(main): Use it.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-signers.c (passphrase\_cb): Change type of r\_hd to void\*\*.  
\* gpg/t-sign.c (passphrase\_cb): Likewise.  
\* gpg/t-decrypt-verify.c (passphrase\_cb): Likewise.  
\* gpg/t-decrypt.c (passphrase\_cb): Likewise.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt-verify.c: Don't include `mcheck.h'. Reported by  
Stphane Corthisy.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (EXTRA\_DIST): Add missing line continuation.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (EXTRA\_DIST): Add \$(key\_id).

2001-12-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile: Rename `pubcerts.kbx' to `pubring.kbx'.

2001-12-15 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (check\_two\_contexts): Set protocols.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-sign.c: New file.  
\* gpgsm/Makefile.am (TESTS): Add t-sign.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-decrypt.c: New file.
- \* gpgsm/567064FE6D14A17B2D811ABB407728BC558AA455: Likewise.
- \* gpgsm/Makefile.am (TESTS): Add t-decrypt.
- (key\_id): New variable.
- (all-local): New target ./private-keys-v1.d/\${key\_id} added.
- (./private-keys-v1.d/\${key\_id}): New target.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-verify.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-verify.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (GPG): Set to @GPG\_PATH@.
- (./pubring.gpg): Use \$(GPG) instead gpg.
- (./secring.gpg): Likewise.

- \* gpgsm/t-import.c (main): Remove third test case.
- \* gpgsm/Makefile.am (GPGSM): Set to @GPGSM@.
- (all-local): New target.
- (./pubcerts.kbx): Likewise.
- \* gpgsm/t-encrypt.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-encrypt.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-keylist.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-keylist.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/cert\_dfn\_pca01.der: New file.
- \* gpgsm/cert\_dfn\_pca15.der: Likewise.
- \* gpgsm/cert\_g10code\_test1.der: Likewise.
- \* gpgsm/t-import.c: Likewise.
- \* gpgsm/Makefile.am (EXTRADIST): Add new files.
- (TESTS): Add t-import.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/: New directory.
- \* Makefile.am, t-verify.c, t-encrypt.c, t-signers.c, t-trustlist.c, t-sign.c, t-keylist.c, t-import.c, t-genkey.c, t-export.c, t-decrypt-verify.c, t-decrypt.c, t-version.c, t-data.c, mkdemodirs, cipher-1.asc, cipher-2.asc, geheim.txt, pubdemo.asc, pubkey-1.asc,

secdemo.asc, seckey-1.asc): Move to sub directory gpg/.

\* gpg/Makefile.am (INCLUDES): Include gpgme/, not include/ and intl/.

(LDD): Correct relative path to gpgme library.

(TESTS): Remove t-version and t-data.

\* gpg/t-verify.c, gpg/t-encrypt.c, gpg/t-signers.c, gpg/t-trustlist.c, gpg/t-sign.c, gpg/t-keylist.c, gpg/t-import.c, gpg/t-genkey.c, gpg/t-export.c, gpg/t-decrypt-verify.c, gpg/t-decrypt.c, t-version.c, t-data.c): Include gpgme.h, not "../gpgme/gpgme.h".

\* Makefile.am: New file.

\* gpgsm/: New directory.

\* gpgsm/Makefile.am: New file.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (TESTS): Add t-decrypt-verify.

\* t-decrypt-verify.c: New file.

\* cipher-2.asc: Likewise.

2001-11-02 Marcus Brinkmann <marcus@g10code.de>

\* t-data.c: Include stddef.h.

(read\_once\_test): Change type of READ to size\_t.

(read\_test): Likewise.

(write\_test): Likewise.

2001-10-29 Marcus Brinkmann <marcus@g10code.de>

\* t-signers.c: New file.

\* Makefile.am (TESTS): Add t-signers.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (TEST\_ENVIRONMENT): Revert last change.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (TEST\_ENVIRONMENT): Set environment to \$(srctdir), not current directory.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* t-data.c (write\_test): New function.

(main): Invoke write\_test for all rounds except TEST\_OUT\_CB.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (INCLUDES): Remove spurious duplicate to silence automake.

2001-10-16 Marcus Brinkmann <marcus@g10code.de>

\* t-version.c: New file.  
\* t-data.c: Likewise.  
\* t-data-1.txt: Likewise.  
\* t-data-2.txt: Likewise.  
\* Makefile.am (TESTS): Add t-version, t-data.

2001-09-17 Werner Koch <wk@gnupg.org>

\* t-keylist.c (check\_two\_contexts): New.

2001-09-03 Werner Koch <wk@gnupg.org>

\* t-encrypt.c (print\_op\_info): New and use it after each operation.

2001-08-28 Werner Koch <wk@gnupg.org>

\* t-sign.c (print\_op\_info): New and use it after each operation.

2001-03-15 Werner Koch <wk@gnupg.org>

\* t-keylist.c (doit): List subkeys too, show caps.

2001-02-13 Werner Koch <wk@gnupg.org>

\* t-verify.c (print\_sig\_stat): Repaled along by unsigned long because we don't use the config stuff here.

2001-02-12 Werner Koch <wk@gnupg.org>

\* tests/t-verify.c (print\_sig\_stat): Print info about the keys.

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EYBmu tt[-%,R+n0j0U00U0U{upz\*D\

v0Ux0v09753http://www.pca.dfn.de/dfnpca/certify/ssl/dfnpca.crx09753http://www.pca.dfn.de/dfnpca/certify/ssl/dfn  
pca.cr10 `HB0) `HBhttps://mystic.pca.dfn.de/0A `HB42http://www.pca.dfn.de/dfnpca/policy/wwwpolicy.html0 `HB

This certificate was issued by the DFN-PCA, the Top Level Certification Authority of the German Research Network (Deutsches Forschungsnetz, DFN).

The key owner's identity was authenticated in accordance with the DFN World Wide Web Policy, v1.00! `HBcgi/check-rev.cgi?0

\*H

\C)2

+ZYG|UCA|PzYFnTj@SA)/<HU+4t?@g?pb5w'Z;dqLi9\((d=,  
,)h?c(MeM44=Qe/\_^^JyYN/61&jPFXifP&#;/KZ

1 xOK?ps

# \*- mode: org \*-

#+TITLE: What's New in the GPGME Python Bindings and Documentation

#+AUTHOR: Ben McGinnes

#+LATEX\_COMPILER: xelatex

#+LATEX\_CLASS: article

#+LATEX\_CLASS\_OPTIONS: [12pt]

#+LATEX\_HEADER: \usepackage{xltextra}

#+LATEX\_HEADER: \usepackage[margin=1in]{geometry}

#+LATEX\_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}

#+LATEX\_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

\* What's New

:PROPERTIES:

:CUSTOM\_ID: new-stuff

:END:

| Version: | 0.0.1 |  
| GPGME Version: | 1.13.0 |  
| Author: | Ben McGinnes <ben@gnupg.org> |  
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |  
| Language: | Australian English, British English |  
| xml:lang: | en-AU, en-GB, en |

Last time the most obviously new thing was adding the /What's New/ section to the HOWTO. Now it's moving it out of the HOWTO.

\*\* New in GPGME 1130

:PROPERTIES:

:CUSTOM\_ID: new-stuff-1-13-0

:END:

Additions since GPGME 1.12.0 include:

- Moving the /What's New/ section out of the basic [[file:gpgme-python-howto.org][HOWTO]] document and into its own file so as to more readily include other documents beyond that HOWTO.

- Moving the preceding, archival, segments into [[file:what-was-new.org][another file]].

- Added =gpg.version.versionintlist= to make it easier for Python developers to check for a specific version number, even with beta

versions (it will drop the "-betaN" part).

- Added expanded detail on issues pertaining to installing for Windows users.
- Bindings enter `[[file:maintenance-mode][maintenance mode]]` from January, 2019.
- Added documentation on maintenance mode and what changes can be made to the code when in that status. Essentially that boils down to bug fixes only and no feature requests.
- The `import-keys-hkp.py` example script, which uses the `=hkp4py=` module to search the SKS servers for a key, has been tightened up to search for both hexadecimal key IDs and user ID strings with reduced chance of unnecessary repetition. There may still be some repetition if a key includes a user ID matching the hexadecimal value of a key ID.

```
1543830060
```

```
##Sketch 1 2
```

```
document()
```

```
layout('A4',1)
```

```
fp((0,0,0))
```

```
ft(1)
```

```
Fn('Helvetica-Bold')
```

```
Fs(18)
```

```
dstyle('Text')
```

```
fp((0,1,0.498))
```

```
ft(1)
```

```
lp((0,0,0))
```

```
lw(0.283465)
```

```
lc(1)
```

```
lj(0)
```

```
ld(0)
```

```
la1()
```

```
la2()
```

```
dstyle('Application Box')
```

```
layer('Layer 1',1,1,0,0,(0,0,0))
```

```
lw(1)
```

```
r(0,0,0,0,688.145,44.1554)
```

```
lw(1)
```

```
r(0,0,0,0,682.363,85.0359)
```

```
lp((0.392,0.584,0.929))
```

```
lw(4.25197)
```

```
b()
```

```
bs(605.383,329.758,0)
```

```
bs(605.383,230.546,0)
```

```
lw(1)
```

```
r(0,0,0,0,807.414,53.6148)
```

```
lp((0.392,0.584,0.929))
```

```
lw(4.25)
```

```
b()
```

```
bs(480.134,240.945,0)
```

bs(480.358,325.277,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(474.803,432.284,0)  
bs(475.334,360.243,0)  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(354.331,432.284,0)  
bs(352.806,361.417,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(212.598,432.284,0)  
bs(212.598,361.417,0)  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5968,0,0,-56.6929,191.608,488.976,0.0603744,0.151107)  
lw(1)  
r(0,0,0,0,88.5492,390.805)  
lp((0.392,0.584,0.929))  
lw(4.25197)  
b()  
bs(226.772,524.409,0)  
bs(226.772,488.976,0)  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(403.937,528.718,0)  
bs(403.937,488.976,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(240.945,432.284,0)  
bs(240.574,394.994,0)  
bs(595.276,396.85,0)  
bs(595.276,361.417,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))

la2((( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(333.071,432.284,0)  
bs(333.07,425.196,0)  
bs(333.07,382.677,0)  
bs(240.945,382.677,0)  
bs(240.945,361.417,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.347,318.897,354.331,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica-Bold')  
Fs(10)  
txt('GPG',(1,0,0,0.905764,344.004,335.686))  
G\_  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3464,446.763,354.33,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('GpgConf',(0.552654,0,0,0.500564,481.802,340.184),1,1)  
G\_  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.347,191.338,354.331,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('GpgSM',(0.552654,0,0,0.500574,226.376,340.185),1,1)  
G\_  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(347.244,325.984,0)  
bs(347.244,325.984,0)  
bs(347.244,255.118,0)

bs(304.724,255.118,0)  
bs(304.724,226.771,0)  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(233.858,325.984,0)  
bs(233.858,255.118,0)  
bs(276.378,255.118,0)  
bs(276.378,226.771,0)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Palatino-Roman')  
txt('2008-07-17',(0.608301,0,0,0.608301,708.661,65.8308))  
lw(1)  
r(0,0,0,0,750.427,153.265)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(219.685,325.984,0)  
bs(219.685,198.425,0)  
bs(219.685,162.992,0)  
G()  
fp((1,1,1))  
lw(0.283465)  
r(113.386,0,0,-42.5196,35.4333,162.992,0.0670228,0.151107)  
fp((0,0,0))  
lw(0.283465)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('LDAP Server',(0.552654,0,0,0.552654,92.1261,148.819),1,1)  
fp((0,0,0))  
lw(0.283465)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('(CRLs, Certificates)',(0.552654,0,0,0.552654,92.1261,134.646),1,1)  
G\_  
G()  
fp((1,1,1))  
lw(0.283465)

```

r(113.386,0,0,-42.5196,35.4331,99.2125,0.0670228,0.151107)
fp((0,0,0))
lw(0.283465)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(18)
txt('HTTP Server',(0.552654,0,0,0.552654,92.1259,85.0394),1,1)
fp((0,0,0))
lw(0.283465)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(18)
txt('(CRLs)',(0.552654,0,0,0.552654,92.1259,70.8662),1,1)
G_()
G()
fp((0.999,1,0.4))
lw(0.283465)
r(70.866,0,0,-31.2962,191.338,158.855,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('DirMgr',(0.552654,0,0,0.552654,224.02,142.978),1,1)
G_()
lw(2)
ld((1, 1))
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(219.15,126.18,0)
bs(219.685,77.9528,0)
bs(155.906,77.9528,0)
lp((0.392,0.584,0.929))
lw(3)
b()
bs(233.858,127.559,0)
bs(233.858,99.2125,0)
bs(276.378,99.2125,0)
bs(276.378,85.0393,0)
lp((0.392,0.584,0.929))
lw(3)
b()
bs(248.031,127.559,0)

```

bs(248.031,113.386,0)  
bs(375.59,113.386,0)  
bs(375.59,85.0393,0)  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(99.2124,0,0,-28.3464,333.07,85.0393,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Certificate Cache',(0.552654,0,0,0.552654,382.606,69.8548),1,1)  
fp((1,0.647,0.31))  
lw(0.283465)  
r(70.5589,0,0,-28.3464,248.031,85.0393,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('CRL Cache',(0.552654,0,0,0.552654,284.147,70.6936),1,1)  
G\_()  
lw(1)  
la2((( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(503.149,240.945,0)  
bs(503.149,283.464,0)  
bs(588.189,283.465,0)  
bs(588.189,325.984,0)  
lw(1)  
la2((( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(503.149,283.464,0)  
bs(503.149,283.464,0)  
bs(361.417,283.464,0)  
bs(361.417,325.984,0)  
lw(1)  
la2((( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(361.417,283.464,0)  
bs(205.512,283.465,0)  
bs(205.512,325.984,0)  
lw(1)

la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(574.015,85.0393,0)  
bs(574.015,141.732,0)  
bs(262.204,141.732,0)  
lw(1)  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(602.361,85.0393,0)  
bs(602.361,170.079,0)  
bs(439.37,170.079,0)  
bs(439.37,311.811,0)  
bs(460.629,311.811,0)  
bs(460.629,325.984,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(389.763,240.945,0)  
bs(389.763,269.291,0)  
bs(290.551,269.291,0)  
bs(290.551,340.157,0)  
bs(262.204,340.157,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(389.763,269.291,0)  
bs(559.843,269.291,0)  
bs(559.843,333.071,0)  
bs(574.016,333.071,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(488.976,85.0393,0)  
bs(488.976,127.559,0)  
bs(389.763,127.559,0)  
bs(389.763,212.598,0)  
lw(2)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(205.512,127.559,0)  
bs(205.512,113.386,0)  
bs(170.079,113.386,0)  
bs(170.079,141.732,0)  
bs(155.906,141.732,0)

lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))  
b()  
bs(622.961,356.76,0)  
bs(622.961,518.503,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3459,573.199,354.33,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('GpgAgent',(0.552654,0,0,0.500554,608.238,340.185),1,1)  
G\_  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(721.712,467.717,0)  
bs(721.712,297.838,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3464,686.278,297.637,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('SCdaemon',(0.552654,0,0,0.500564,721.316,283.492),1,1)  
G\_  
fp((1,0.647,0.31))  
lw(0.283465)  
lj(1)  
r(86.162,0,0,-117.493,679.192,566.929,0.181818,0.333333)  
G()  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Smartcard',(0.552654,0,0,0.552654,698.127,491.036))  
fp((0.999,1,0.4))

lw(0.283465)  
r(70.5589,0,0,-31.2962,686.279,557.593,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('Card Reader',(0.552654,0,0,0.552654,721.318,541.975),1,1)  
G\_  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(73.6353,0,0,-41.2944,587.066,565.703,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('PIN Entry',(0.57675,0,0,0.729211,623.632,545.097),1,1)  
G\_  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))  
b()  
bs(643.758,340.157,0)  
bs(643.758,340.157,0)  
bs(707.539,340.158,0)  
bs(707.539,304.724,0)  
lw(1)  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))  
b()  
bs(574.016,283.465,0)  
bs(587.066,283.464,0)  
bs(686.278,283.464,0)  
G()  
lp((0.392,0.584,0.929))  
lw(4.25197)  
b()  
bs(98.9053,325.985,0)  
bs(98.9053,240.945,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3464,63.7795,354.331,0.0670228,0.151107)  
fp((0,0,0))

```
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('WatchGnuPG',(0.552654,0,0,0.552654,98.8185,338.713),1,1)
G_()
G()
fp((1,0.647,0.31))
lw(0.283465)
r(70.5589,0,0,-28.1194,63.7795,240.718,0.0670228,0.168178)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('Log Socket',(0.552654,0,0,0.552654,98.8175,225.1),1,1)
G_()
G_()
G()
fp((1,0.647,0.31))
lw(0.283465)
r(85.0392,0,0,-28.3464,446.457,240.945,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(18)
txt('Config Files',(0.552654,0,0,0.552654,485.621,226.772),1,1)
G_()
G()
fp((1,0.647,0.31))
lw(0.283465)
r(85.0392,0,0,-28.3464,545.669,85.0394,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(18)
txt('Config Files',(0.552654,0,0,0.552654,584.834,70.8662),1,1)
G_()
```

G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(84.6546,0,0,-27.3609,347.245,239.959,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Help Files',(0.552654,0,0,0.552654,388.252,224.705),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(84.6546,0,0,-27.3609,446.457,85.0394,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Help Files',(0.552654,0,0,0.552654,487.464,69.7854),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(85.0392,0,0,-28.3464,248.032,240.945,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Keybox Files',(0.552654,0,0,0.552654,289.59,226.322),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(70.866,0,0,-28.3464,574.016,240.945,0.0670228,0.151107)  
fp((0,0,0))  
le()

lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Private Keys',(0.552654,0,0,0.552654,609.449,226.772),1,1)  
G\_()  
G()  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(24)  
txt('Scute',(0.552654,0,0,0.599958,224.978,465.775),1,1)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Times-Roman')  
Fs(10)  
txt('(pkcs#11)',(1,0,0,1.08559,206.081,445.011))  
G\_()  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(198.827,0,0,-56.6929,304.322,488.976,0.0603744,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(36)  
txt('GPGME Library',(0.552654,0,0,0.552654,404.952,457.853),1,1)  
G\_()  
G()  
lw(1)  
style('Application Box')  
r(197.598,0,0,-42.5187,304.724,566.928,0.0152672,0.0677968)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
txt('GPGME aware Application',(0.98062,0,0,0.937018,334.892,540.985))

```

G_()
G()
lw(1)
style('Application Box')
r(127.829,0,0,-41.7496,162.992,566.159,0.0152672,0.0677968)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
txt('Legacy Application',(174.688,540.01))
G_()
G()
G()
lp((0.392,0.584,0.929))
lw(4.25197)
b()
bs(749.296,162.296,0)
bs(705.89,162.296,0)
lw(3.25)
ld((1, 1))
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(705.89,100.083,0)
bs(744.472,100.083,0)
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(705.89,131.189,0)
bs(744.472,131.189,0)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('execute/access',(0.31891,0,0,0.280771,726.951,87.3768),1,1)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('closely linked',(0.31891,0,0,0.280771,724.715,149.589),1,1)
fp((0,0,0))
le()
lw(1)

```

```

Fn('Helvetica')
Fs(14)
style('Text')
txt('Assuan protocol',(0.31891,0,0,0.280771,728.535,118.483),1,1)
G_()
lw(1)
r(56.6929,0,0,-92.126,701.575,170.079)
G_()
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))
b()
bs(248.031,325.984,0)
bs(248.031,297.638,0)
bs(538.583,297.638,0)
bs(538.583,340.157,0)
bs(566.929,340.157,0)
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))
b()
bs(375.591,325.984,0)
bs(375.591,304.724,0)
bs(531.496,304.724,0)
bs(531.496,347.244,0)
bs(566.929,347.244,0)
guidelayer('Guide Lines',1,0,0,1,(0,0,1))
grid((0,0,7.08661,7.08661),1,(0,0,1),'Grid')
2011-12-02 Werner Koch <wk@g10code.com>

```

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-10-25 Marcus Brinkmann <marcus@g10code.com>

- \* Makefile.am: Remove build rules for libpgpme-pth.
- \* pgpme.m4: Remove support for libpgpme-pth.

2011-05-26 Marcus Brinkmann <marcus@g10code.com>

- \* decrypt.c (pgpme\_op\_decrypt\_start, pgpme\_op\_decrypt): Check CTX.
- \* decrypt-verify.c (pgpme\_op\_decrypt\_verify\_start (pgpme\_op\_decrypt\_verify): Likewise.
- \* delete.c (pgpme\_op\_delete\_start, pgpme\_op\_delete): Likewise.

- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_edit)  
(gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start, gpgme\_op\_encrypt): Likewise.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start)  
(gpgme\_op\_encrypt\_sign): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export)  
(gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext)  
(gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start, gpgme\_op\_genkey): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start)  
(gpgme\_op\_getauditlog): Likewise.
- \* gpgconf.c (gpgme\_op\_conf\_load, gpgme\_op\_conf\_save): Likewise.
- \* import.c (gpgme\_op\_import\_start, gpgme\_op\_import\_keys\_start)  
(gpgme\_op\_import\_keys, gpgme\_op\_import): Likewise.
- \* keylist.c (gpgme\_op\_keylist\_start, gpgme\_op\_keylist\_ext\_start):  
Likewise.
- \* opassuan.c (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact\_ext): Likewise.
- \* passwd.c (gpgme\_op\_passwd\_start, gpgme\_op\_passwd): Likewise.
- \* sign.c (gpgme\_op\_sign\_start, gpgme\_op\_sign): Likewise.
- \* trustlist.c (gpgme\_op\_trustlist\_start)  
(gpgme\_op\_trustlist\_next): Likewise.
- \* verify.c (gpgme\_op\_verify\_start, gpgme\_get\_sig\_key): Likewise.
- \* op-support.c (\_gpgme\_op\_data\_lookup): Likewise.
- \* vfs-create.c (gpgme\_op\_vfs\_transact, gpgme\_op\_vfs\_create): Likewise.
- \* vfs-mount.c (gpgme\_op\_vfs\_mount, gpgme\_op\_vfs\_transact): Likewise.
- \* gpgme.c (gpgme\_set\_protocol)  
(gpgme\_set\_sub\_protocol)  
(gpgme\_set\_armor, gpgme\_set\_include\_certs)  
(gpgme\_set\_keylist\_mode, gpgme\_set\_passphrase\_cb)  
(gpgme\_set\_progress\_cb, gpgme\_set\_io\_cbs, gpgme\_set\_locale)  
(gpgme\_ctx\_set\_engine\_info, gpgme\_sig\_notation\_clear): Likewise.
- \* gpgme.c (gpgme\_new): Check for valid R\_CTX.  
(gpgme\_cancel, gpgme\_cancel\_async, gpgme\_release): Likewise.

2011-04-06 Werner Koch <wk@g10code.com>

- \* gpgme-config.in: Add option --host. Change options --cflags and --libs to collapse duplicate include and lib dirs. Try to put extra libs at the end.

- \* gpgme.h.in: Use INSERT\_\_TYPEDEFS\_FOR\_GPGME\_H to include platform specific typedefs.

2011-02-03 Werner Koch <wk@g10code.com>

- \* extra-stati.h: New.
- \* mkstatus: Extend to also process extra-stati.h

\* Makefile.am (main\_sources): Add extra-stati.h  
(status-table.h): Depend on extra-stati.h and adjust rule.

2011-02-03 Marcus Brinkmann <marcus@g10code.com>

\* w32-io.c (\_gpgme\_io\_socket): Return fd, not res.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* assuan-support.c (my\_socket, my\_connect): New functions.  
(\_gpgme\_assuan\_system\_hooks): Add my\_Socket, my\_connect.  
\* priv-io.h (\_gpgme\_io\_socket): New prototype.  
\* w32-io.c (pid\_to\_handle, handle\_to\_oid, fd\_to\_handle): Remove macros.  
(is\_socket): Remove function.  
(\_gpgme\_io\_spawn) [HAVE\_W32CE\_SYSTEM]: Remove some dead code.  
(\_gpgme\_io\_spawn): Translate handles before DuplicateHandle them.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* w32-util.c (mkstemp): Don't use CreateFile instead of open (the  
function is not used on Windows CE, and the callers were not  
adjusted).

2011-01-21 Marcus Brinkmann <mb@g10code.com>

\* engine-gpgconf.c (\_gpgme\_conf\_opt\_change): Fix the case that is  
not self-assignment.

2010-12-08 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (strcpy\_escaped\_plus): New.  
(DIM, xtoi\_1, xtoi\_2): New.  
(cmd\_keylist): Allow for multiple patterns.

2010-11-23 Marcus Brinkmann <mb@g10code.com>

\* w32-io.c (create\_reader, create\_writer): Use small stack size on  
Windows CE.

2010-11-23 Marcus Brinkmann <mb@g10code.com>

\* gpgme.h.in (gpgme\_conf\_arg\_new): Make VALUE arg const void \*.  
\* gpgconf.c (\_gpgme\_conf\_arg\_new): Likewise.  
(gpgme\_conf\_arg\_new): Likewise.  
\* engine-gpgconf.c (\_gpgme\_conf\_arg\_new): Likewise.  
(gpgconf\_write): Remove debug hack.

2010-11-19 Marcus Brinkmann <mb@g10code.com>

\* engine-gpgconf.c (\_gpgme\_conf\_opt\_change): Support self-assignment. Requested by Marc Mutz.

2010-11-17 Marcus Brinkmann <mb@g10code.com>

\* vasprintf.c (int\_vasprintf) [HAVE\_W32CE\_SYSTEM]: Just use a fixed size buffer, as va\_copy is not easy to fake.

2010-11-15 Marcus Brinkmann <mb@g10code.com>

\* w32-ce.h (strcasecmp, strdup) [\_MSC\_VER]: Define.

\* genkey.c, passphrase.c: Include util.h.

\* w32-util.c (\_gpgme\_w32ce\_get\_debug\_envvar): Fix return value.

2010-11-15 Werner Koch <wk@g10code.com>

\* data-compat.c (gpgme\_data\_new\_from\_filepart) (gpgme\_data\_new\_from\_file) [W32CE && \_MSC\_VER]: Return not GPG\_ERR\_NOT\_IMPLEMENTED.

\* w32-ce.h (HKEY\_PERFORMANCE\_DATA, HKEY\_CURRENT\_CONFIG, \_IOLBF) (abort) [\_MSC\_VER]: Provide these macros.

\* ath.h [W32CE && \_MSC\_VER]: Include winsock2.h.

\* ath.c (ath\_read, ath\_write) [W32CE && \_MSC\_VER]: Do not call non-available functions.

2010-11-04 Werner Koch <wk@g10code.com>

\* w32-ce.h [\_MSC\_VER && W32CE]: Undef leave.

\* export.c: Include util.h so that we get the above undef.

\* memrchr.c: Remove. Used to be a replacement function required by the formerly included assuan code.

2010-11-03 Werner Koch <wk@g10code.com>

\* debug.c (\_gpgme\_debug) [W32CE]: Replace localtime by GetLocalTime.

\* signers.c (gpgme\_signers\_clear): Remove useless return. Reported by Patrick Spendrin.

\* w32-util.c: s/\_\_\_inline\_\_\_/GPG\_ERR\_INLINE/

\* setenv.c: Include string.h due to our strerror replacement.

\* w32-ce.h (access, bsearch): New macros.  
\* w32-ce.c (\_gpgme\_wince\_access): New.  
(RegQueryValueExA): Change DATA to a void\*.  
(\_gpgme\_wince\_bsearch): New. Taken from glibc 2.6.

Guard include of sys/stat.h and sys/types.h.

2010-11-02 Werner Koch <wk@g10code.com>

\* data-fd.c (read, write, lseek) [W32CE && ! \_\_MINGW32CE\_\_]: New.  
Taken from Pedro Alves Public Domain code.

\* w32-ce.h (SHGetSpecialFolderPath): Remove our defines and prototypes. We use the system provided prototypes now.

\* w32-ce.c: Include shlobj.h

(\_WIN32\_IE): Define to 0x0400

(CreateFileA): New.

\* w32-util.c: Explicitly include windows headers before util.h.

(\_gpgme\_w32ce\_get\_debug\_envvar): Do not use wchar\_t strings for read\_w32\_registry\_string.

(mkstemp): Use CreateFile instead of open.

\* w32-io.c (handle\_to\_fd, fd\_tohandle): Add. We need them for W32.

\* w32-util.c (\_WIN32\_IE): Define to 0x0400.

\* util.h [W32]: Include windows.h.

\* w32-sema.c: Do not include windows.h directly.

\* ath.c (ssize\_t, pid\_t)[\_MSC\_VER]: Add new types.

\* gpgme.c (gpgme\_result\_ref, gpgme\_result\_unref): Do not use a void pointer in pointer arithmetic.

\* w32-util.c: Include util.h prior to ath.h. Don't include windows.h directly.

(F\_OK): Define if not defined.

\* w32-ce.c: Include string.h.

(RegQueryValueExA): Use WINAPI modifier to match the declaration.

\* vfs-create.c: Include string.h because under W32CE with MSC we get a warning related to our strerror replacement.

\* encrypt-sign.c: Include stdlib.h, string.h and errno.h.

\* priv-io.h [W32CE]: Include w32-ce.h

\* w32-ce.h: Include winsock2.h and ws2tcpip.h.

(\_MSV\_VER): Remove useless macro.

(pid\_t): Add typedef.

Guard all includes of unistd.h and sys/time.h.

2010-10-28 Marcus Brinkmann <marcus@g10code.com>

\* opassuan.c (gpgme\_op\_assuan\_transact\_ext): Fix uninitialized value use. Reported by Marc Mutz.

2010-10-07 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (ARGP\_ERR\_UNKNOWN): Use EDEADLK if available.

\* w32-util.c (\_gpgme\_w32ce\_get\_debug\_envvar) [W32CE]: New.

\* debug.c (debug\_init) [W32CE]: Use new function.

2010-09-16 Werner Koch <wk@g10code.com>

\* import.c: Include "util.h".

(parse\_import): Return GPG\_ERR\_MISSING\_ISSUER\_CERT.

\* util.h: Add fallback define for GPG\_ERR\_MISSING\_ISSUER\_CERT.

\* op-support.c: Include "util.h".

(\_gpgme\_parse\_inv\_recv): Handle new code 12.

2010-09-02 Marcus Brinkmann <marcus@g10code.de>

\* error.c (gpgme\_err\_code\_to\_errno): Fix cut and paste bug (thanks to Marc Mutz).

2010-09-01 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c: Revert change from 2009-06-18, as it created a race condition.

2010-08-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.def: Add gpgme\_err\_code\_from\_syserror and gpgme\_err\_set\_errno.

\* libgpgme.vers: Likewise.

\* gpgme.h.in (gpgme\_error\_from\_errno): Fix return type to gpgme\_error\_t.

(gpgme\_err\_code\_from\_syserror, gpgme\_err\_set\_errno): New prototype.

(gpgme\_error\_from\_syserror): New inline function (why are gpgme\_err\_make\_from\_errno and gpgme\_error\_from\_errno not inline functions?).

\* error.c (gpgme\_error\_from\_errno): Fix return type to gpgme\_error\_t.

(gpgme\_err\_set\_errno, gpgme\_err\_code\_from\_syserror): New functions.

2010-08-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (result\_encrypt\_to\_xml, result\_sign\_to\_xml)

(result\_verify\_to\_xml, result\_import\_to\_xml)

(result\_genkey\_to\_xml): Check vigorously for null pointers.

\* w32-io.c (GPGCEDEV\_IOCTL\_ASSIGN\_RVID): New macro.  
(\_gpgme\_io\_spawn): Use ASSIGN\_RVID.

2010-06-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_spawn): Remove debug printf.

2010-06-10 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (gpgme\_server): Use special hack for Windows CE to get at stdin and stdout.

\* engine-gpgsm.c (gpgsm\_new): Translate returned achild\_fds back to child\_fds.

\* debug.h (TRACE\_SUC6): New macro.

\* w32-io.c (MAX\_SLAFD): New macro.

(fd\_table): New static variable.

(new\_fd, release\_fd): New functions.

(fd\_to\_handle, handle\_to\_fd, handle\_to\_socket): Remove macros.

(MAX\_READERS, MAX\_WRITERS): Increase to 64.

(notify\_table): Increase to MAX\_SLAFD.

(struct reader\_context\_s, struct writer\_context\_s): Add member file\_sock.

(reader, writer): Use file\_hd vs file\_sock to decide if socket operations to use. Remove auto-detect mode.

(create\_reader, create\_writer): Set file\_sock. Unblock pending thread only if this is a pipe fd.

(\_gpgme\_io\_pipe): Allocate fds from table and return slot indices instead of windows handles. This allows to properly handle RVIDs.

(\_gpgme\_io\_close): Handle dup'ed file descriptors.

(build\_commandline) [HAVE\_W32\_SYSTEM]: Use RVID from fd table now.

(\_gpgme\_io\_spawn): Use fd table now.

(\_gpgme\_io\_fd2str): Use RVID from fd table now.

(\_gpgme\_io\_dup): Implement using fd table.

(\_gpgme\_io\_socket): Allocate fds from table.

(\_gpgme\_io\_connect): Use fd from table.

\* w32-glib-io.c (find\_channel): Check that the slot is used.

2010-06-09 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c [HAVE\_W32CE\_SYSTEM]: Include assuan.h and winioctl.h.

(GPGCEDEV\_IOCTL\_UNBLOCK) [HAVE\_W32CE\_SYSTEM]: Define.

(set\_synchronize) [HAVE\_W32CE\_SYSTEM]: Stub it out.

(is\_socket): Allow to return -1 for auto-detect (old behaviour).

(is\_socket) [HAVE\_W32CE\_SYSTEM]: Return -1.

(reader): Handle auto-detect case. Handle ctx->stop\_me before

checking for EOF.

(destroy\_reader) [HAVE\_W32CE\_SYSTEM]: Unblock a pending reader.

(writer): Handle auto-detect case. Handle ctx->stop\_me with  
ERROR\_BUSY.

(destroy\_writer) [HAVE\_W32CE\_SYSTEM]: Unblock a pending writer.

(\_gpgme\_io\_pipe) [HAVE\_W32CE\_SYSTEM]: Implement in terms of a  
half-pipe.

(build\_commandline) [HAVE\_W32CE\_SYSTEM]: New function.

(\_gpgme\_io\_spawn) [HAVE\_W32CE\_SYSTEM]: Implement it differently  
for this platform.

(\_gpgme\_io\_fd2str) [HAVE\_W32CE\_SYSTEM]: Implement it for RVIDs.

(\_gpgme\_io\_dup) [HAVE\_W32CE\_SYSTEM]: Stub it out.

\* gpgme-tool.c (result\_add\_timestamp): Add missing NULL argument.

(result\_sign\_to\_xml): Protect against NULL fingerprint.

(struct server): New members input\_fd, input\_filename,  
input\_stream output\_fd, output\_filename, output\_stream,  
message\_filename, message\_stream.

(server\_reset\_fds): Deallocate those.

(server\_parse\_fd): New function.

(server\_data\_obj): Take optional filename argument and direction  
argument. Also take new argument to return a filestream that  
needs to be closed after destroying the data object.

Change all callers, too.

(input\_notify, output\_notify): Removed.

(cmd\_input, cmd\_output): New functions.

(gpgme\_server): Do not register input and output notifier.

(register\_commands): Use cmd\_input and cmd\_output.

(cmd\_message): Rewritten to use server\_parse\_fd.

(cmd\_delete, cmd\_keylist): Fix inverted option check.

(main) [HAVE\_W32CE\_SYSTEM]: Sleep a bit to work around bug in ssh.

\* genkey.c (gpgme\_op\_genkey): Return err with TRACE\_ERR.

2010-05-12 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c (\_gpgme\_timegm) [HAVE\_W32\_SYSTEM]: New static  
function.

(\_gpgme\_parse\_timestamp) [HAVE\_W32\_SYSTEM]: Use it.

\* gpgme-tool.c (main): Protect call to setlocale with  
HAVE\_SETLOCALE.

\* Makefile.am (system\_components): Remove custom cppflags from  
RCCOMPILER (because gpg-error adds -idirafter that makes RC bail.  
[HAVE\_W32CE\_SYSTEM]: Add w32-ce.h and w32-ce.c, clear  
libexec\_PROGRAMS.

\* w32-ce.h, w32-ce.c: New files.

\* priv-io.h: Include <sys/types.h>  
\* util.h: Likewise.

2010-05-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-util.c: Include ath.h  
(HAVE\_ALLOW\_SET\_FOREGROUND\_WINDOW) [!HAVE\_W32CE\_SYSTEM]: Define it.  
(RTLD\_LAZY, dlopen, dlsym, dlclose) [!HAVE\_ALLOW\_SET\_FORGROUND\_WINDOW]: Don't define anymore.  
(\_gpgme\_allow\_set\_foreground\_window) [!HAVE\_ALLOW\_SET\_FOREGROUND\_WINDOW]: Make it a stub.  
(read\_w32\_registry\_string): Use FooA variants of Windows functions instead of Foo (which dispatches depending on UNICODE).  
[!HAVE\_W32CE\_SYSTEM]: Don't check environment.  
(w32\_shgetfolderpath): Remove.  
(find\_program\_at\_standard\_place): Call SHGetSpecialFolderPath (which is available on all Windows systems and also Windows CE).  
(mkstemp): Use ath\_self instead of getpid.  
(\_gpgme\_mkstemp): Use GetTempPathA instead of GetTempPath.  
  
\* gpgme.h.in: Use \_WIN32 instead of \_MSC\_VER. Include time.h for time\_t.

2010-05-07 Marcus Brinkmann <marcus@g10code.de>

\* engine-g13.c, gpgme.c, engine-gpgsm.c, engine-gpg.c, op-support.c, engine-assuan.c, gpgme-tool.c: Include <locale.h> only if available with HAVE\_LOCALE\_H and conditionalize use of LC\_CTYPE on its definition.  
\* engine-gpgconf.c: Do not include <locale.h>.  
  
\* engine-gpgsm.c (gpgsm\_new, start): Cast between int and assuan\_fd\_t.  
\* assuan-support.c (my\_pipe, my\_close, my\_read, my\_write): Likewise.  
\* gpgme-tool.c (server\_data\_obj, server\_reset\_fds, gpgme\_server), (my\_recvmsg, my\_sendmsg, my\_spawn): Likewise.  
\* engine-assuan.c (start): Likewise.  
\* engine-g13.c (start): Likewise.

2010-05-06 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c, w32-io.c, w32-qt-io.cpp, w32-sema.c, w32-util.c: Do not include <signal.h>.  
  
\* sign.c, data-user.c, conversion.c, debug.c, verify.c, data.c,

decrypt.c, delete.c, assuan-support.c, import.c, engine-gpgsm.c,  
data-mem.c, op-support.c, w32-io.c, w32-util.c, data-compat.c: Use  
gpg\_error\_from\_syserror instead gpg\_error\_from\_errno, and use  
gpg\_err\_set\_errno to set error number.

\* setenv.c: Include <gpg-error.h> and define \_\_set\_errno to use  
gpg\_err\_set\_errno.

\* gpgme-tool.c (ARGP\_ERR\_UNKNOWN): Define to EDEADLOCK (which is  
mapped in Windows CE) instead of E2BIG (which is not).

(gt\_import\_keys): Initialize err.

2010-04-19 Marcus Brinkmann <marcus@g10code.de>

\* assuan-support.c (my\_spawn): Cast to avoid warning.

\* engine-g13.c (g13\_new): Make ARGV array of pointer to const  
char.

(g13\_assuan\_simple\_command) [!USE\_DESCRIPTOR\_FUNCTION]: Don't define.

\* ops.h (\_gpgme\_key\_append\_name): Same in prototype.

\* key.c (\_gpgme\_key\_append\_name): Make SRC argument pointer to  
const char.

\* posix-util.c (\_gpgme\_get\_uiserver\_socket\_path): Make HOMEDIR  
const.

\* vfs-mount.c (gpgme\_op\_vfs\_transact\_start): Never define this  
potentially useful but currently unused function.

\* vfs-create.c (gpgme\_op\_vfs\_transact\_start): Likewise.

2010-04-16 Werner Koch <wk@g10code.com>

\* w32-io.c (is\_socket): New.

(reader, writer): Use it to figure out the API to use.

2010-03-15 Werner Koch <wk@g10code.com>

\* gpgme.h.in: Add autoconf template to set generated file to  
read-only in an emacs buffer.

2010-03-12 Werner Koch <wk@g10code.com>

\* gpgme.h.in (GPGME\_STATUS\_SUCCESS): Use the right file for the  
change; see below.

\* passwd.c (op\_data\_t): New.

(passwd\_start): Setup OPD.

(passwd\_status\_handler): Return GPG\_ERR\_NOT\_SUPPORTED if needed.

\* context.h (OPDATA\_PASSWD): New.

\* gpgme.h (GPGME\_STATUS\_SUCCESS): New.

2010-03-09 Werner Koch <wk@g10code.com>

\* engine-gpgsm.c (gpgsm\_keylist): Try to start the agent.

2010-02-17 Werner Koch <wk@g10code.com>

\* posix-io.c (notify\_table): Change implementation.  
(notify\_table\_item\_t, notify\_table\_size, notify\_table\_lock): New.  
(\_gpgme\_io\_close, \_gpgme\_io\_set\_close\_notify): Adjust for new  
implementation.

2010-02-16 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (spacep, has\_option, skip\_options): New.  
(cmd\_export): Implement option --minimal.

\* gpgme.h.in (GPGME\_EXPORT\_MODE\_MINIMAL): New.  
\* export.c (export\_start, export\_ext\_start): Implement it.  
\* engine-gpg.c (export\_common): Ditto.

2010-01-25 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_connect): Fix return code check to make it work.

\* version.c (do\_subsystem\_inits): Remove superfluous second  
WSAStartup.

2010-01-22 Werner Koch <wk@g10code.com>

\* w32-io.c (writer): Try to use send first.  
(reader): Try to use recv first.

2010-01-08 Werner Koch <wk@g10code.com>

\* engine-gpg.c (gpg\_passwd): New.  
(\_gpgme\_engine\_ops\_gpg): Register.  
\* passwd.c (parse\_error): New.  
(passwd\_status\_handler): Use it.

2010-01-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (result\_xml\_write\_cb\_t, struct result\_xml\_state):  
New types.  
(MAX\_TAGS): New macro.  
(result\_init, result\_xml\_indent, result\_xml\_tag\_start)  
(result\_xml\_tag\_data, result\_xml\_tag\_end, result\_add\_error)  
(result\_add\_pubkey\_algo, result\_add\_hash\_algo, result\_add\_keyid)  
(result\_add\_fpr, result\_add\_timestamp, result\_add\_sig\_mode)  
(result\_add\_value, result\_add\_string, result\_encrypt\_to\_xml)  
(result\_decrypt\_to\_xml, result\_sign\_to\_xml)

(result\_verify\_to\_xml, result\_import\_to\_xml)  
(result\_genkey\_to\_xml, result\_keylist\_to\_xml)  
(result\_vfs\_mount\_to\_xml): New functions.  
(gt\_result): Rewritten.

2010-01-05 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (gt\_passwd, cmd\_passwd): New.  
(register\_commands): Register.

\* gpgme.h.in (gpgme\_op\_passwd\_start, gpgme\_op\_passwd): New.  
\* libgpgme.vers, gpgme.def: Add new functions.  
\* passwd.c: New.  
\* Makefile.am (main\_sources): Add passwd.c  
\* engine.c, engine.h (\_gpgme\_engine\_op\_passwd): New.  
\* engine-backend.h (struct engine\_ops): Add PASSWD.  
\* engine-gpgsm.c (gpgsm\_passwd): New.  
(\_gpgme\_engine\_ops\_gpgsm): Register.  
(gpgsm\_reset): Reset only if we have a connection.

\* gpgme.h.in (GPGME\_PK\_ECDSA, GPGME\_PK\_ECDH): New.  
\* gpgme.c (gpgme\_pubkey\_algo\_name): Add them.

2009-12-22 Marcus Brinkmann <marcus@g10code.de>

\* debug.c: Test for TLS, not \_\_GNU\_\_

2009-12-15 Marcus Brinkmann <marcus@g10code.de>

\* assuan-support.c (my\_spawn): Calloc, not malloc, the fd\_items.

2009-12-10 Werner Koch <wk@g10code.com>

\* debug.c (debug\_init): Test on sgid process.

2009-12-08 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (LTRCCOMPILER): Refactor with ...  
(RCCOMPILER): ... this new macro.  
(SUFFIXES): Add .lo.  
(gpgme\_res\_ldflag): Removed.  
(gpgme\_res): Use libtool object file name here.  
(libgpgme\_la\_LDFLAGS): Remove gpgme\_res\_ldflag usage.  
(libgpgme\_la\_LIBADD): Add gpgme\_res.

\* ath.c (ath\_self) [HAVE\_W32\_SYSTEM]: Fix typo.

2009-12-02 Werner Koch <wk@g10code.com>

\* gpgconf.c (gpgme\_conf\_arg\_release): No return in a function returning void. Reported by Wyllys Ingersoll.

2009-12-01 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (cmd\_getauditlog): Add flag --html.  
(hlp\_getauditlog): New.

\* gpgme-tool.c (GT\_GCC\_A\_SENTINEL, GT\_GCC\_A\_PRINTF): New.  
(gt\_write\_status): Use sentinel.  
(argp\_error, log\_error): Use printf attribute.  
(argp\_parse): Remove extra argument to argp\_error.  
(\_gt\_progress\_cb, gt\_get\_engine\_info, gt\_get\_keylist\_mode)  
(gt\_result): Add NULL arg.

2009-11-26 Marcus Brinkmann <marcus@g10code.de>

\* opassuan.c (opassuan\_start): Allocate result structure before beginning operation.

2009-11-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (gpgme\_server): Use assuan\_fd\_t and assuan\_fdopen on fds.

2009-11-13 <wk@g10code.com>

\* sign.c (\_gpgme\_sign\_status\_handler): Handle SIG\_CREATED\_SEEN.  
\* engine-uiserver.c (uiserver\_sign): Make sending SENDER optional.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_reset): Instead of last change, only set sub protocol if it is not the default.

2009-11-10 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_op\_reset): Ignore GPG\_ERR\_NOT\_IMPLEMENTED while setting the sub protocol.

\* engine-uiserver.c (uiserver\_new): Pass fdpassing flag to assuan\_socket\_connect.  
(set\_recipients): Replace fingerprint by user id.

\* engine-gpgsm.c (set\_recipients): Fix non-terminating loop in case of a missing key.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (gpgme\_new): Set default sub protocol.
- \* gpgme-tool.c: Implement get sub protocol.
  
- \* gpgme.h.in (gpgme\_get\_sub\_protocol): Add prototype.
- \* gpgme.def, libgpgme.vers: Add gpgme\_get\_sub\_protocol.
- \* context.h (struct gpgme\_context): New member sub\_protocol.
- \* gpgme.c (gpgme\_set\_sub\_protocol): Set CTX->sub\_protocol.  
(gpgme\_get\_sub\_protocol): New function.
- \* op-support.c (\_gpgme\_op\_reset): Set sub protocol.
  
- \* Makefile.am (uiserver\_components): New variable.  
(main\_sources): Add it.
- \* ops.h, key.c (\_gpgme\_key\_append\_name): Take CONVERT argument, implement it. Adjust callers.  
(gpgme\_key\_from\_uid): New function.
- \* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_DEFAULT.  
(gpgme\_encrypt\_flags\_t): Add GPGME\_ENCRYPT\_PREPARE, GPGME\_ENCRYPT\_EXPECT\_SIGN.  
(gpgme\_set\_sub\_protocol, gpgme\_key\_from\_uid): New functions.
- \* libgpgme.vers, gpgme.def: Add new functions.
- \* gpgme.c (gpgme\_set\_protocol): Add UIServer protocol.  
(gpgme\_set\_sub\_protocol): New function.  
(gpgme\_get\_protocol\_name): Add UIServer and default protocol.
- \* assuan-support.c: Return correct error values, implement socketpair for POSIX.
- \* priv-io.h, posix-io.c, w32-io.c, w32-glib-io.c, w32-qt-io.cpp (\_gpgme\_io\_spawn): Add ATFORK and ATFORKVALUE arguments. Implement it for POSIX. Adjust all callers.
- \* engine.h, engine-backend.h (\_gpgme\_engine\_set\_protocol) (\_gpgme\_engine\_op\_decrypt\_verify): New prototypes. Adjust all users.
- \* engine.c (engine\_ops, gpgme\_get\_engine\_info): Add UIServer engine.  
(\_gpgme\_engine\_set\_protocol, \_gpgme\_engine\_op\_decrypt\_verify): New function.
- \* decrypt-verify.c (decrypt\_verify\_start): Call \_gpgme\_engine\_op\_decrypt\_verify.
- \* util.h, posix-util.c, w32-util.c (\_gpgme\_get\_uiserver\_socket\_path): New function.
- \* engine-gpgsm.c (gpgsm\_set\_fd): Fix \_gpgme\_io\_pipe invocation.
- \* gpgme-tool.c: Some support for UIServer protocol.
- \* engine-uiserver.c: New file.

2009-11-09 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (gpgsm\_new): Close server side FDs.

2009-11-06 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme-tool.c (struct gpgme\_tool): New members write\_data and write\_data\_hook.
- (gt\_write\_data): New function.
- (gt\_result): Output vfs\_mount result.
- (server\_write\_data): New function.
- (gpgme\_server): Initialize write\_data members.

2009-11-05 Marcus Brinkmann <marcus@g10code.de>

- \* engine-g13.c (struct engine\_g13): Remove members RESULT\_CB and RESULT\_CB\_VALUE.
- (g13\_assuan\_simple\_command, status\_handler): Don't use those anymore.
- (g13\_transact): Remove them from argument list, too.
- \* vfs-mount.c (\_gpgme\_vfs\_mount\_status\_handler): New function.
- (\_gpgme\_op\_vfs\_mount): Pass it to transact.
  
- \* engine-assuan.c (lass\_new): Update use of assuan\_socket\_connect.
- \* engine-gpgsm.c (gpgsm\_new): Update use of assuan\_pipe\_connect.
- \* engine-g13.c (g13\_new): Likewise.
  
- \* priv-io.h (IOspawn\_FLAG\_NOCLOSE): New flag.
- \* w32-io.c (\_gpgme\_io\_spawn): Implement this flag.
- \* posix-io.c (\_gpgme\_io\_spawn): Likewise.
- \* w32-glib-io.c (\_gpgme\_io\_spawn): Likewise.
- \* assuan-support.c (my\_spawn): Set this flag.
  
- \* decrypt.c (gpgme\_op\_decrypt\_start): Fix use of debug macro.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify\_start): Likewise.
- \* delete.c (gpgme\_op\_delete\_start): Likewise.
- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_card\_edit\_start): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start): Likewise.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export\_ext\_start) (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start): Likewise.
- \* import.c (gpgme\_op\_import\_start, gpgme\_op\_import\_keys\_start): Likewise.
- \* opassuan.c (gpgme\_op\_assuan\_transact\_start): Likewise.
- \* sign.c (gpgme\_op\_sign\_start): Likewise.
- \* verify.c (gpgme\_op\_verify\_start): Likewise.
- \* vfs-create.c (gpgme\_op\_vfs\_create): Likewise.
- \* vfs-mount.c (gpgme\_op\_vfs\_mount): Likewise.

2009-11-04 Marcus Brinkmann <marcus@g10code.de>

- \* ath.h (ath\_self): New prototype. Include <stdint.h>
- \* ath.c, ath-pth.c, ath-pthread.c (ath\_self): New function.
- \* debug.h: Rewrite most macros to beautify debug output.
- (\_gpgme\_debug\_buffer): Remove tagname and tag argument.
- (\_gpgme\_debug\_frame\_begin, \_gpgme\_debug\_frame\_end): New prototypes.
- \* debug.c: Include <time.h>. Don't include assuan.h.
- (frame\_nr, FRAME\_NR): New thread-specific variable and macro.
- (debug\_init): Do not initialize assuan. Call \_gpgme\_debug after initialization instead using printf directly.
- (\_gpgme\_debug): Do not call debug\_init (we now ensure proper initialization by user). Add timestamp and thread/process ID.
- (\_gpgme\_debug\_buffer): Do not take tagname and tag argument.
- (\_gpgme\_debug\_frame\_begin, \_gpgme\_debug\_frame\_end): New functions.
- \* version.c (gpgme\_check\_version\_internal, gpgme\_check\_version):
- Fix debug string. Do not initialize assuan.
- \* posix-io.c (get\_max\_fds): Use 0 not NULL (nicer debug output).

2009-11-04 Werner Koch <wk@g10code.com>

- \* gpgme-tool.c (register\_commands): Add HELP feature.

2009-11-03 Werner Koch <wk@g10code.com>

- \* gpgme.h.in (GPGME\_PROTOCOL\_UISERVER): New.

2009-11-03 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (main\_sources): Change g13.c to vfs-mount.c. Add vfs-create.c
- \* vfs-create.c: New file.
- \* g13.c: Renamed to ...
- \* vfs-mount.c: ... this new file.
- \* gpgme.h.in (gpgme\_op\_vfs\_create): New prototype.
- \* gpgme.def, libgpgme.vers: Add gpgme\_op\_vfs\_create.
- \* gpgme-tool.c (gt\_vfs\_create, cmd\_vfs\_create): New functions.
- (register\_commands): Add VFS\_CREATE and CREAET.

2009-11-02 Marcus Brinkmann <marcus@g10code.de>

- \* debug.h (\_gpgme\_debug\_buffer): Make TAG argument const const.
- \* debug.c (\_gpgme\_debug\_buffer): Likewise.
- \* gpgme-tool.c (input\_notify, output\_notify): Adjust type to new assuan interface.
- \* decrypt.c (gpgme\_op\_decrypt\_result): Remove unused variable.
- \* opassuan.c (gpgme\_op\_assuan\_transact): Fix return value.

2009-10-30 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (noinst\_PROGRAMS): New target gpgme-tool.
- (gpgme\_tool\_LDADD): New variable.
- \* gpgme-tool.c: New file.
- \* ops.h (\_gpgme\_sig\_notation\_clearm \_gpgme\_signers\_clear): New prototypes.
- \* gpgme.c (gpgme\_set\_protocol): Allow GPGME\_PROTOCOL\_GPGCONF (when had that gone missing?).
- (\_gpgme\_sig\_notation\_clear): New function without debug output.
- (gpgme\_release): Call it and \_gpgme\_signers\_clear.
- \* signers.c (\_gpgme\_signers\_clear): New function without debug output.
- \* g13.c (gpgme\_op\_vfs\_mount): Add debug output.
- \* assuan-support.c (my\_spawn): Allow fd\_child\_list to be NULL.
- \* conversion.c (\_gpgme\_encode\_percent\_string): Fix infinite loop.
- \* debug.h: Put tag in front of debug lines, should make for nicer output.
- \* engine-assuan.c (lass\_new): Use our new system hooks for libassuan.
- \* engine-g13.c (g13\_new): Remove redundant assuan context allocation.
- \* version.c (gpgme\_check\_version\_internal): Delay debug output until after gpgme\_check\_version was called.

2009-10-28 Marcus Brinkmann <marcus@g10code.de>

- \* signers.c, encrypt-sign.c, encrypt.c, delete.c, keylist.c, edit.c, import.c, export.c: Fix last change in debug output.

2009-10-27 Marcus Brinkmann <marcus@g10code.de>

- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_edit)
- (gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): Add debug output.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start)
- (gpgme\_op\_encrypt\_sign): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start, gpgme\_op\_encrypt)
- (gpgme\_op\_encrypt\_result): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export)
- (gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext)
- (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start, gpgme\_op\_genkey)
- (gpgme\_op\_genkey\_result): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start)
- (gpgme\_op\_getauditlog): Likewise.
- \* import.c (gpgme\_op\_import\_result, gpgme\_op\_import\_start)
- (gpgme\_op\_import): Likewise.
- \* keylist.c (gpgme\_op\_keylist\_result, keylist\_colon\_handler)
- (gpgme\_op\_keylist\_start, gpgme\_op\_keylist\_ext\_start)
- (gpgme\_op\_keylist\_next, gpgme\_op\_keylist\_end, gpgme\_get\_key): Likewise.
- \* opassuan.c (gpgme\_op\_assuan\_transact\_start)

(gpgme\_op\_assuan\_transact\_ext, gpgme\_op\_assuan\_result)  
(gpgme\_op\_assuan\_transact): Likewise.  
\* signers.c (gpgme\_signers\_add, gpgme\_signers\_clear): Likewise.  
\* trustlist.c (gpgme\_op\_trustlist\_start)  
(gpgme\_op\_trustlist\_next, gpgme\_op\_trustlist\_end): Likewise.  
\* verify.c (gpgme\_op\_verify\_start, gpgme\_op\_verify)  
(gpgme\_op\_verify\_result): Likewise.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (struct gpgme\_io\_event\_done\_data)  
(gpgme\_io\_event\_done\_data\_t): New types.  
(struct \_gpgme\_op\_assuan\_result): Deprecate the err member.  
(gpgme\_op\_assuan\_result): Deprecate (for now).  
(gpgme\_op\_assuan\_transact\_ext): New prototype.  
(gpgme\_op\_assuan\_transact): Deprecate.  
(struct \_gpgme\_op\_g13\_result): Replace with ...  
(struct \_gpgme\_op\_vfs\_mount\_result): ... this.  
(gpgme\_op\_g13\_mount): Replace with ...  
(gpgme\_op\_vfs\_mount): ... this.  
\* gpgme.def (gpgme\_op\_assuan\_transact\_ext, gpgme\_wait\_ext)  
(gpgme\_op\_vfs\_mount\_result, gpgme\_op\_vfs\_mount): New.  
(gpgme\_op\_g13\_mount): Remove.  
\* libgpgme.vers: Likewise.  
\* engine-backend.h (struct engine\_ops): Remove RESULT\_CB and  
RESULT\_CB\_VALUE args in opassuan\_transact member. Add CANCEL\_OP  
member.  
\* ops.h (\_gpgme\_cancel\_with\_err, \_gpgme\_wait\_on\_condition): Add  
OP\_ERR argument.  
(\_gpgme\_wait\_one\_ext): New prototype.  
\* context.h (ctx\_op\_data\_id\_t): Add OPDATA\_VFS\_MOUNT.  
\* engine-g13.c (g13\_cancel\_op): New function.  
(parse\_status): Remove declaration.  
(g13\_assuan\_simple\_command): Do nothing with status lines for now.  
(status\_handler): Update opaque value access.  
(\_gpgme\_engine\_ops\_g13): Add new cancel\_op member.  
\* gpgme.c (\_gpgme\_cancel\_with\_err): Add new parameter OP\_ERR.  
Handle operational errors.  
(gpgme\_cancel, gpgme\_io\_read, gpgme\_io\_write): Add debug output.  
\* data.c (\_gpgme\_data\_inbound\_handler)  
(\_gpgme\_data\_outbound\_handler): Adjust opaque value access.  
\* engine-gpg.c (command\_handler, status\_handler)  
(colon\_line\_handler): Likewise.  
\* engine-gpgsm.c (status\_handler): Likewise.  
\* engine-gpg.c (\_gpgme\_engine\_ops\_gpg): Add cancel\_op member.  
\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Likewise.  
\* g13.c: Rewritten (and will be rewritten again).  
\* engine.h (\_gpgme\_engine\_op\_assuan\_transact): Remove result\_cb

and result\_cb\_value parameters from prototype.

(\_gpgme\_engine\_cancel\_op): New prototype.

\* engine.c (engine\_ops) [! ENABLE\_ASSUAN]: Add missing comma.

(\_gpgme\_engine\_op\_assuan\_transact): Remove result\_cb and result\_cb\_value parameter.

(\_gpgme\_engine\_cancel\_op): New function.

\* wait.h (\_gpgme\_run\_io\_cb): Add new argument OP\_ERR.

(struct io\_cb\_data): New struct to pass opaque data and get a op\_err return value. Needed because we can't modify I/O callback handler signature because it is exposed to the user.

\* wait.c (\_gpgme\_run\_io\_cb): Add OP\_ERR parameter. Handle operational errors.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Handle operational errors.

\* wait-private.c (\_gpgme\_wait\_on\_condition): New argument to retrieve the operational result. Handle operational errors in session based protocols.

(\_gpgme\_wait\_one\_ext): New function.

(\_gpgme\_wait\_one): Pass argument in invocation of \_gpgme\_wait\_on\_condition.

\* wait-global.c (struct ctx\_list\_item): Add member OP\_ERR.

(ctx\_done): New argument OP\_ERR.

(ctx\_wait): New argument OP\_ERR.

(gpgme\_wait\_ext): New function based on gpgme\_wait but handling operational errors.

(gpgme\_wait): Implement in term of gpgme\_wait\_ext.

\* keylist.c (gpgme\_op\_keylist\_next): Pass argument in invocation of \_gpgme\_wait\_on\_condition.

\* trustlist.c (gpgme\_op\_trustlist\_next): Pass argument in invocation of \_gpgme\_wait\_on\_condition.

\* engine-assuan.c (struct engine\_llas): Replace members RESULT\_CB and RESULT\_CB\_VALUE by LAST\_OP\_ERR.

(\_gpgme\_engine\_assuan\_last\_op\_err): Add this hack function.

(llas\_cancel\_op): New function.

(\_gpgme\_engine\_llas\_ops): Add cancel\_op member.

(llas\_status\_handler): Update opaque value access.

(llas\_transact): Remove RESULT\_CB and RESULT\_CB\_VALUE arguments.

\* opassuan.c: Move compat hacks to the end of file.

(opassuan\_start): Do not set OPD->result.err.

Do not pass RESULT\_Cb and CTX to \_gpgme\_engine\_op\_assuan\_transact.

(gpgme\_op\_assuan\_transact\_ext): New function.

\* debug.h (DEBUG\_GLOBAL): New debug level.

\* conversion.c (gnupg\_errors, \_gpgme\_map\_gnupg\_error): Removed.

\* data-user.c (gpgme\_data\_new\_from\_cbs): Add debug output.

\* data-fd.c (gpgme\_data\_new\_from\_fd): Likewise.

\* data-stream.c (gpgme\_data\_new\_from\_stream): Likewise.

\* decrypt.c (gpgme\_op\_decrypt\_result, gpgme\_op\_decrypt\_start)

(gpgme\_op\_decrypt): Likewise.  
\* delete.c (gpgme\_op\_delete\_start, gpgme\_op\_delete): Likewise.  
\* decrypt-verify.c (gpgme\_op\_decrypt\_verify\_start)  
(gpgme\_op\_decrypt\_verify): Likewise.  
\* sign.c (gpgme\_op\_sign\_result): Fix debug message.  
\* data-mem.c (gpgme\_data\_new): Improve debug output.  
\* verify.c (parse\_trust): Use atoi instead of  
\_gpgme\_map\_gnupg\_error.  
\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Likewise.

2009-10-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am: Remove @NETLIBS@ from LIBADDs.  
(g13\_components): New variable.  
(main\_sources): Add \$(g13\_components).  
\* g13.c, engine-g13.c: New files.  
\* engine.c (engine\_ops): Check for assuan for assuan engine, add  
g13 engine.  
\* util.h (\_gpgme\_get\_g13\_path, \_gpgme\_encode\_percent\_string): New  
prototypes.  
\* conversion.c (\_gpgme\_encode\_percent\_string): New function.  
\* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_G13.  
(struct\_gpgme\_op\_g13\_result, gpgme\_g13\_result\_t): New types.  
(gpgme\_op\_g13\_mount): New function.  
\* gpgme.def, libgpgme.vers: Add gpgme\_op\_g13\_mount.  
\* gpgme.c (gpgme\_set\_protocol): Allow GPGME\_PROTOCOL\_G13.  
(gpgme\_get\_protocol\_name): Add GPGME\_PROTOCOL\_G13.  
\* posix-util.c (\_gpgme\_get\_g13\_path): New function.  
\* w32-util.c (\_gpgme\_get\_g13\_path): New function.  
\* engine-backend.h (\_gpgme\_engine\_ops\_g13): New declaration.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (netlibs): Remove.  
(assuan\_cflags, assuan\_libs): Add.  
  
\* Makefile.am (assuan\_cppflags, assuan\_libobjs): Removed.  
(gpgsm\_components): Move engine-assuan.c to ...  
(assuan\_components): ... this new variable.  
(main\_sources): Add this new variable.  
(AM\_CPPFLAGS): Remove \$(assuan\_cppflags).  
(AM\_CFLAGS): Add @LIBASSUAN\_CFLAGS@.  
(libgpgme\_la\_DEPENDENCIES, libgpgme\_pth\_la\_DEPENDENCIES)  
(libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_qt\_la\_DEPENDENCIES)  
(libgpgme\_pthread\_la\_DEPENDENCIES): Remove \$(assuan\_libobjs).  
(libgpgme\_la\_LIBADD, libgpgme\_pth\_la\_LIBADD)  
(libgpgme\_glib\_la\_LIBADD, libgpgme\_qt\_la\_LIBADD))  
(libgpgme\_pthread\_la\_LIBADD): Replace \$(assuan\_libobjs) by

@LIBASSUAN\_LIBS@.

- \* priv-io.h [HAVE\_W32\_SYSTEM]: Declare \_gpgme\_io\_recvmsg, \_gpgme\_io\_sendmsg, \_gpgme\_io\_waitpid.
- \* engine-backend.h: Define with [ENABLE\_ASSUAN] instead of [ENABLE\_GPGSM].
- \* posix-io.c (\_gpgme\_io\_waitpid): Make non-static.
- \* util.h (ENABLE\_ASSUAN): Declare \_gpgme\_assuan\_system\_hooks, \_gpgme\_assuan\_malloc\_hooks, \_gpgme\_assuan\_log\_cb.
- \* engine-gpgsm.c: Don't map assuan error codes. Use assuan\_release instead of assuan\_disconnect.
- (map\_assuan\_error): Remove function.
- (gpgsm\_new): Use new assuan context interface.
- \* engine-assuan.c: Use assuan\_release instead of assuan\_disconnect.
- (lass\_new): Use new assuan context interface.

2009-10-07 <wk@g10code.com>

- \* priv-io.h [W32]: Include windows.h instead of sys/socket.h.

2009-08-06 Werner Koch <wk@g10code.com>

- \* op-support.c (\_gpgme\_parse\_inv\_recp): Allow for no fingerprint.
- \* engine-gpgsm.c (gpgsm\_sign): Hook up the status func for the SIGNER command.
- \* gpgme.h.in (GPGME\_STATUS\_INV\_SGMR, GPGME\_STATUS\_NO\_SGMR): New.
- \* sign.c (op\_data\_t): Add fields IGNORE\_INV\_RECP and INV\_SGMR\_SEEN.
- (\_gpgme\_op\_sign\_init\_result): Factor code out to ...
- (sign\_init\_result): .. new. Init new fields.
- (sign\_start): Use sign\_init\_result.
- (\_gpgme\_sign\_status\_handler): Take care of the new INV\_SGMR.
- Return an error if no signature has been created.

2009-07-07 Werner Koch <wk@g10code.com>

- \* engine-gpgsm.c (struct engine\_gpgsm): Add fields input\_helper\_data and input\_helper\_memory.
- (close\_notify\_handler): Release these new fields.
- (gpgsm\_import): Implement the keyarray feature.
- \* engine-gpg.c (gpg\_import): Actually return GPG\_ERR\_INV\_VALUE.
- \* engine-gpgsm.c (gpgsm\_import): Return an error for unknown data encodings.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* debug.h: Everywhere, use %p instead of 0x%x to print pointer.  
[HAVE\_STDINT\_H]: Include <stdint.h>.  
(\_TRACE, TRACE, TRACE0, TRACE1, TRACE2, TRACE3, TRACE6): Cast tag  
to (uintptr\_t) before casting it to (void\*) to silence GCC  
warning.

\* gpgme.h.in (\_GPGME\_DEPRECATED\_OUTSIDE\_GPGME): New macro.  
\* sign.c (\_GPGME\_IN\_GPGME): Define it.  
\* keylist.c (\_GPGME\_IN\_GPGME): Define it.

\* debug.c (\_gpgme\_debug\_begin, \_gpgme\_debug\_add): Handle error in  
vasprintf and asprintf.

\* priv-io.h: Include <sys/socket.h>. Declare \_gpgme\_io\_connect.

2009-06-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (GPGME\_CONF\_PATHNAME): Revert last change, it's  
back! (GPA still uses it...).

\* gpgme.def: Fix stupid typo.  
\* w32-io.c (\_gpgme\_io\_pipe): Add missing declaration.

\* gpgme.h.in (GPGME\_CONF\_PATHNAME): Remove obsolete macro.

\* w32-io.c (\_gpgme\_io\_pipe): Allocate reader/writer thread right  
away.

(\_gpgme\_io\_read, \_gpgme\_io\_write, \_gpgme\_io\_select)

(\_gpgme\_io\_dup): Never allocate threads here.

(find\_writer, find\_reader): Check return value of thread creation  
function.

\* context.h (CTX\_OP\_DATA\_MAGIC): New macro.

(struct ctx\_op\_data): New member MAGIC.

\* op-support.c (\_gpgme\_op\_data\_lookup): Initialize magic.

\* gpgme.c (gpgme\_result\_unref, gpgme\_result\_ref): Check magic.

2009-06-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_result\_unref): Hot fix to release a lock.

\* gpgme.c (result\_ref\_lock): New global variable.

(gpgme\_result\_ref, gpgme\_result\_unref): use it.

2009-06-16 Werner Koch <wk@g10code.com>

\* version.c: Include stdlib.h.

\* gpgme.h.in (gpgme\_data\_encoding\_t): Add GPGME\_DATA\_ENCODING\_URL, GPGME\_DATA\_ENCODING URLESC, GPGME\_DATA\_ENCODING\_URL0.

\* data.c (gpgme\_data\_set\_encoding): Adjust for new values.

\* engine-gpg.c (string\_from\_data): New.

(gpg\_import): Implement --fetch-key feature.

\* gpgme.h.in (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): New.

\* gpgme.def, libgpgme.vers: Add them.

\* export.c (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): New.

(export\_keys\_start): New.

\* gpgme.h.in (gpgme\_export\_mode\_t, GPGME\_EXPORT\_MODE\_EXTERN): New.

(gpgme\_op\_export\_start, gpgme\_op\_export, gpgme\_op\_export\_ext\_start)

(gpgme\_op\_export\_ext): Change arg RESERVED to MODE of new compatible type.

\* export.c (gpgme\_export\_ext\_start, gpgme\_op\_export)

(gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext): Ditto.

(export\_start): Ditto.

\* engine.c (\_gpgme\_engine\_op\_export): Ditto.

\* engine-backend.h (struct engine\_ops): Ditto.

\* engine-gpgsm.c (gpgsm\_export, gpgsm\_export\_ext): Ditto.

\* engine-gpg.c (gpg\_export, gpg\_export\_ext): Ditto. Implement mode EXTERN.

(gpg\_export, gpg\_export\_ext): Factor common code out to ..

(export\_common): .. this.

\* gpgme.h.in (gpgme\_op\_import\_keys\_start, gpgme\_op\_import\_keys): New.

\* gpgme.def, libgpgme.vers: Add them.

\* import.c (gpgme\_op\_import\_keys\_start, gpgme\_op\_import\_keys): New.

(\_gpgme\_op\_import\_keys\_start): New.

\* engine.c (\_gpgme\_engine\_op\_import): Add arg KEYARRAY.

\* engine-backend.h (struct engine\_ops): Ditto.

\* engine-gpgsm.c (gpgsm\_import): Ditto. Not functional.

\* engine-gpg.c (gpg\_import): Ditto. Implement it.

2009-06-15 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_result\_ref, gpgme\_result\_unref): Add prototypes.

\* gpgme.def, libgpgme.vers (gpgme\_result\_ref, gpgme\_result\_unref): Add these.

\* context.h (struct ctx\_op\_data): Add member "references".

\* gpgme.c (gpgme\_result\_ref, gpgme\_result\_unref): New functions.

(\_gpgme\_release\_result): Use gpgme\_result\_unref.

\* op-support.c (\_gpgme\_op\_data\_lookup): Initialize references.

2009-06-12 Werner Koch <wk@g10code.com>

\* gpgme-w32spawn.c (translate\_get\_from\_file): Parse optional spawn flags. Add new arg R\_FLAGS. Fix segv on file w/o LF.  
(translate\_handles): Add new arg R\_FLAGS. Avoid possible segv.  
(main): Pass flags for my\_spawn.  
(my\_spawn): Add arg FLAGS and implement AllowSetForegroundWindow.

\* priv-io.h (IOSPAWN\_FLAG\_ALLOW\_SET\_FG): New.  
\* w32-io.c (\_gpgme\_io\_spawn): Add arg FLAGS and implement it.  
\* w32-glib-io.c (\_gpgme\_io\_spawn): Ditto.  
\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Ditto.  
\* posix-io.c (\_gpgme\_io\_spawn): Add dummy arg FLAGS.  
\* engine-gpg.c (start): Call spawn with new flag.

\* w32-util.c (\_gpgme\_allow\_set\_foreground\_window): Rename to \_gpgme\_allow\_set\_foreground\_window. Change all callers.  
\* posix-util.c (\_gpgme\_allow\_set\_foreground\_window): Ditto.

2009-06-10 Werner Koch <wk@g10code.com>

\* w32-util.c (\_gpgme\_allow\_set\_foreground\_window): Add trace support.

2009-06-09 Werner Koch <wk@g10code.com>

\* engine-gpg.c (gpg\_io\_event): Test for cmd.fd.

\* version.c (gpgme\_check\_version\_internal): Make result const.

\* gpgme.c: Include priv-io.h.

(gpgme\_io\_read, gpgme\_io\_write): New.

\* libgpgme.vers (GPGME\_1.1): Add them.

\* gpgme.def: Ditto.

\* Makefile.am (main\_sources): Remove gpgme.h.

(include\_HEADERS): Rename to nodist\_include\_HEADERS so that a VPATH build won't use the distributed one.

\* util.h (GPG\_ERR\_NOT\_OPERATIONAL): Define.

2009-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_check\_version\_internal): New prototype.

(gpgme\_check\_version): New macro, overriding function of the same name.

\* libgpgme.vers, gpgme.def: Add gpgme\_check\_version\_internal.o

\* context.h (\_gpgme\_selftest): New variable declaration.

\* version.c: Include "context.h".

(gpgme\_check\_version): Set \_gpgme\_selftest on success.

(gpgme\_check\_version\_internal): New function.

\* gpgme.c (\_gpgme\_selftest): Define it.  
(gpgme\_new): Check the selftest result.

2009-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_encrypt\_flags\_t): Add  
GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO.  
\* engine-gpg.c (gpg\_encrypt): Pass --no-encrypt-to to gpg if  
GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO flag is set.

2009-05-14 Werner Koch <wk@g10code.com>

\* gpgme.h.in (gpgme\_status\_code\_t): Explicitly initialize for  
better maintainability and to help debugging.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in: Add compile time check for \_FILE\_OFFSET\_BITS.

2009-04-15 Marcus Brinkmann <marcus@g10code.de>

\* posix-io.c (\_gpgme\_io\_socket, \_gpgme\_io\_connect): New functions.  
\* w32-io.c (\_gpgme\_io\_connect): Fix stupid error.

2009-04-08 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (giochannel\_table): New members used, fd, socket.  
(find\_channel): Drop CREATE argument.  
(new\_dummy\_channel\_from\_fd, new\_channel\_from\_fd)  
(new\_channel\_from\_socket): New functions.  
(\_gpgme\_io\_fd2str): Implement for sockets.  
(\_gpgme\_io\_write, \_gpgme\_io\_read): Translate EAGAIN errors  
correctly.  
(\_gpgme\_io\_pipe): Fix for new channel bookkeeping.  
(\_gpgme\_io\_close, \_gpgme\_io\_dup): Likewise.  
(wsa2errno, \_gpgme\_io\_socket, \_gpgme\_io\_connect): New.  
\* w32-io.c (MAX\_READERS, MAX\_WRITERS): Bump up to 40.  
(wsa2errno, \_gpgme\_io\_socket, \_gpgme\_io\_connect): New.  
\* w32-qt-io.cpp (\_gpgme\_io\_socket, \_gpgme\_io\_connect): New stubs.  
\* version.c [HAVE\_W32\_SYSTEM]: Include "windows.h."  
(do\_subsystem\_inits) [HAVE\_W32\_SYSTEM]: Call WSASStartup.  
\* engine-assuan.c (lass\_status\_handler): Ignore EAGAIN errors.

2009-03-18 Werner Koch <wk@g10code.com>

\* gpgme.h.in (GPGME\_KEYLIST\_MODE\_EPHEMERAL): New.  
\* engine-gpgsm.c (gpgsm\_keylist): Send new option.

2009-03-13 Werner Koch <wk@g10code.com>

\* gpgme-config.in: Make sure locale is set to C.

2009-02-24 Werner Koch <wk@g10code.com>

\* gpgme.h.in (struct \_gpgme\_op\_assuan\_result): New.  
(gpgme\_assuan\_result\_t): New.  
(gpgme\_op\_assuan\_result): Change return type.  
(struct \_gpgme\_assuan\_sendfnc\_ctx)  
(gpgme\_assuan\_sendfnc\_ctx\_t, gpgme\_assuan\_sendfnc\_t): Remove.  
(gpgme\_assuan\_inquire\_cb\_t): Changed.  
\* opassuan.c (op\_data\_t): Make use of a result structure.  
(gpgme\_op\_assuan\_result): Change return type.  
(opassuan\_start): Use result structure.  
(result\_cb): Ditto.  
\* engine-assuan.c (struct \_gpgme\_assuan\_sendfnc\_ctx): Remove.  
(inquire\_cb\_sendfnc): Remove.  
(inquire\_cb): Change for new callback scheme. Not yet finished.  
(lass\_status\_handler): Allow sending a CANCEL from the inquire CB.

2009-02-04 Werner Koch <wk@g10code.com>

\* w32-glib-io.c (\_gpgme\_io\_spawn): Make ARGV argument const to match prototype.  
\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Ditto.

2009-02-03 Werner Koch <wk@g10code.com>

\* gpgme.h.in (struct \_gpgme\_subkey): Add fields IS\_CARDKEY and CARD\_NUMBER..  
\* key.c (gpgme\_key\_unref): Release field CARD\_NUMBER.  
\* keylist.c (keylist\_colon\_handler): Factor common code out to ...  
(parse\_sec\_field15): New. Set card number.

2009-01-26 Werner Koch <wk@g10code.com>

\* opassuan.c, dirinfo.c, engine-assuan.c: New.  
\* Makefile.am: Add them.  
\* engine-backend.h: Add \_gpgme\_engine\_ops\_assuan.  
(struct engine\_ops): Add field OPASSUAN\_TRANSACT. Update all engine initializers.  
\* Makefile.am (gpgsm\_components): Add engine-assuan.c.  
\* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_ASSUAN.  
(gpgme\_assuan\_data\_cb\_t, gpgme\_assuan\_sendfnc\_ctx\_t)  
(gpgme\_assuan\_inquire\_cb\_t, gpgme\_assuan\_status\_cb\_t): New.  
(gpgme\_op\_assuan\_transact\_start, gpgme\_op\_assuan\_transact): New.  
\* gpgme.c (gpgme\_get\_protocol\_name): Ditto.

(gpgme\_set\_protocol): Support it.  
\* engine.c (gpgme\_get\_engine\_info): Ditto.  
(engine\_ops): Register it.  
(\_gpgme\_engine\_op\_assuan\_transact): New.  
\* libgpgme.vers (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact): New.  
\* gpgme.def (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact): New.  
\* engine-backend.h (struct engine\_ops): Add GET\_HOME\_DIR and initialize to NULL for all engines.  
\* engine.c (engine\_get\_home\_dir): New.  
(gpgme\_get\_engine\_info): Use it.  
(\_gpgme\_set\_engine\_info): Use it.  
\* engine.h (engine\_assuan\_result\_cb\_t): New.  
\* context.h (ctx\_op\_data\_id\_t): Add OPDATA\_ASSUAN.  
  
\* util.h (GPG\_ERR\_UNFINISHED): Define if not yet defined.  
  
\* version.c (gpgme\_check\_version): Protect trace arg against NULL.

2009-01-19 Werner Koch <wk@g10code.com>

\* runpgg.c: Rename to engine-gpg.c  
\* Makefile.am (main\_sources): Ditto.

2008-12-03 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (status-table.h): Use \$(builddir) to find gpgme.h.

2008-11-18 Werner Koch <wk@g10code.com>

\* version.c (do\_subsystem\_inits): Always initialize I/O subsystem. Fixes regression from 2007-08-02.  
  
\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Use \_gpgme\_map\_gnupg\_error to parse the error code for decrypt.algorithm.

2008-10-30 Marcus Brinkmann <marcus@g10code.de>

\* wait-private.c (\_gpgme\_wait\_on\_condition): Remove unused variable IDX.  
\* wait-global.c: Include ops.h to silence gcc warning.  
(\_gpgme\_wait\_global\_event\_cb): Pass error value directly.  
\* wait-user.c: Include ops.h to silence gcc warning.  
  
\* posix-io.c (\_gpgme\_io\_spawn): Make ARGV argument const to silence gcc warning. Cast argument to execv to silence warning.  
\* w32-io.c (\_gpgme\_io\_spawn): Likewise.

\* priv-io.h (`_gpgme_io_spawn`): Likewise for prototype.

2008-10-24 Werner Koch <wk@g10code.com>

\* `runpgg.c` (`gpg_keylist_preprocess`): Escape backslashes too.

2008-10-23 Marcus Brinkmann <marcus@g10code.de>

\* `runpgg.c` (`gpg_keylist_preprocess`): Convert percent escaped string to C coded string.

2008-10-20 Werner Koch <wk@g10code.com>

\* `Makefile.am` (`EXTRA_DIST`): Add `gpgme.h.in`.

\* `gpgme.h`: Rename to `gpgme.h.in`.

\* `gpgme.h.in` (`GPGME_VERSION`): Use `autoconf` substitution.

\* `posix-io.c`: Include `sys/uio.h`. Fixes bug #818.

2008-10-18 Marcus Brinkmann <marcus@g10code.com>

\* `w32-util.c` (`find_program_in_registry`): Don't define.  
(`_gpgme_get_gpg_path`, `_gpgme_get_gpgsm_path`)  
(`_gpgme_get_gpgconf_path`): Do not check for `fooProgram` in the registry anymore. It is now no longer possible to overwrite the default location in that way.

2008-10-17 Werner Koch <wk@g10code.com>

\* `w32-glib-io.c` (`_gpgme_io_fd2str`): Use `"%d"` and not `"%ld"` to work around a bug in `mingw32`.

2008-09-23 Marcus Brinkmann <marcus@g10code.com>

\* `gpgme.c` (`gpgme_sig_notation_clear`): Clear `CTX->sig_notations`.  
Submitted by "Daniel Mueller" <daniel@danm.de>

2008-09-16 Marcus Brinkmann <marcus@g10code.com>

\* `runpgg.c` (`gpg_new`): Don't use `errno` with `ttyname_r`.

2008-08-11 Marcus Brinkmann <marcus@g10code.com>

\* `runpgg.c` (`gpg_cancel`): Remove `cmd fd` before `status fd`.  
\* `gpgme.c` (`_gpgme_cancel_with_err`): New function.  
(`gpgme_cancel`): Reimplement in terms of `_gpgme_cancel_with_err`.  
\* `wait-private.c` (`_gpgme_wait_on_condition`): Use

\_gpgme\_cancel\_with\_err.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Likewise.

\* wait-global.c (\_gpgme\_wait\_global\_event\_cb, gpgme\_wait): Likewise.

2008-08-08 Marcus Brinkmann <marcus@g10code.com>

\* runpgg.c (command\_handler): Remove I/O callback on error, too.

2008-06-29 Marcus Brinkmann <marcus@g10code.com>

\* gpgme.c (gpgme\_cancel\_async): Remove unused variable.

2008-06-27 Marcus Brinkmann <marcus@g10code.de>

\* libgpgme.vers: Add gpgme\_cancel\_async.

\* gpgme.def: Likewise.

\* context.h: Include "sema.h".

(struct gpgme\_context): New members lock and canceled.

\* gpgme.c (gpgme\_new): Initialize lock.

(gpgme\_release): Destroy lock.

(gpgme\_cancel\_async): New function.

\* op-support.c (\_gpgme\_op\_reset): Reset the canceled flag.

\* wait-global.c (gpgme\_wait): Check cancel flag before processing any I/O callbacks.

\* wait-private.c (\_gpgme\_wait\_on\_condition): Likewise.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Likewise.

2008-06-26 Werner Koch <wk@g10code.com>

\* w32-util.c (\_gpgme\_mkstemp): Replace sprint by stpcpy.

(mkstemp): Need to use GetSystemTimeAsFileTime for better compatibility.

2008-06-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-w32spawn.c: New file.

\* Makefile.am (libexec\_PROGRAMS) [HAVE\_W32\_SYSTEM]: New variable with gpgme-w32spawn.

\* engine-gpgsm.c (gpgsm\_new): Use server translated handles.

(gpgsm\_set\_locale): Return early if locale value is NULL.

\* util.h (\_gpgme\_mkstemp)

(\_gpgme\_get\_w32spawn\_path) [HAVE\_W32\_SYSTEM]: New function prototypes.

\* w32-util.c: Include <stdint.h>, <sys/stat.h> and <unistd.h>.

(letters, mkstemp, \_gpgme\_mkstemp, \_gpgme\_get\_w32spawn\_path): New functions.

\* runpgg.c (gpg\_decrypt, gpg\_encrypt, gpg\_encrypt\_sign)

(gpg\_genkey, gpg\_import, gpg\_verify, gpg\_sign): Pass data over special filename FD rather than stdin.

(struct arg\_and\_data\_s): Add member ARG\_LOCP.

(struct fd\_data\_map\_s): Add member ARG\_LOC.

(struct engine\_gpg): Add member ARG\_LOC to status and colon.

(\_add\_arg, add\_arg\_with\_locp): New function.

(add\_arg\_ext): Reimplement in terms of \_add\_arg.

(gpg\_new): Remember argument location for status FD.

(build\_argv): Set argument location if requested. Also set argument location of fd\_data\_map for data items.

(start): Adjust caller of \_gpgme\_io\_spawn.

\* priv-io.h (struct spawn\_fd\_item\_s): Add members peer\_name and arg\_loc.

(\_gpgme\_io\_spawn): Remove parent fd list argument.

\* posix-io.c (get\_max\_fds): New function.

(\_gpgme\_io\_dup): Add tracing.

(\_gpgme\_io\_spawn): Remove parent fd list. Change meaning of child fd list to contain all child fds that should be inherited. Close all other file descriptors after fork.

\* w32-io.c, w32-glib-io.c, w32-qt-io.c(\_gpgme\_io\_spawn): Remove parent fd list. Change meaning of child fd list to contain all child fds that should be inherited. Do not inherit any file descriptors, but DuplicateHandle them. Spawn process through wrapper process. Provide wrapper process with a temporary file containing handle translation data. Return translated handle names.

\* w32-io.c (reader): Add more tracing output.

(\_gpgme\_io\_read): Likewise.

\* engine-gpgconf.c (gpgconf\_read): Adjust caller of \_gpgme\_io\_spawn.

\* version.c (\_gpgme\_get\_program\_version): Likewise.

2008-06-20 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_read): Change ARGV initialization for compatibility with old compilers. Fix amount of memmove. Fix CR removal.

2008-06-19 Werner Koch <wk@g10code.com>

\* gpgme.h (GPGME\_CONF\_PATHNAME): Replace by GPGME\_CONF\_FILENAME, change all callers and provide compatibility macro.

(gpgme\_conf\_type\_t): Add complex types 34..37.

\* engine-gpgconf.c (gpgconf\_parse\_option, arg\_to\_data)

(\_gpgme\_conf\_arg\_new, \_gpgme\_conf\_arg\_release): Add new types.

2008-06-19 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgconf.c (gpgconf\_parse\_option): Fix comma detection.

2008-05-09 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_read): Do not pass empty lines to the callback.

2008-05-07 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_write): Change argv[0] to a self-explaining string. Needs a proper fix, though.

\* runpgp.c (gpg\_keylist, gpg\_keylist\_ext): Factor common code out to ..

(gpg\_build\_keylist\_options): .. new. Allow combination of extern and intern mode.

(gpg\_new): DFT\_TTYNAME is an array, thus check the first character.

2008-05-06 Werner Koch <wk@g10code.com>

\* version.c (extract\_version\_string): New.

(\_gpgme\_get\_program\_version): Use it to allow for suffixes in the version line.

2008-04-28 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_read): Fixed segv. Avoid memmove for each line.

2008-04-22 Marcus Brinkmann <marcus@g10code.de>

\* w32-qt-io.cpp, kdpipeiodevice.cpp: New versions from Frank Osterfeld, implement blocking select.

2008-03-11 Marcus Brinkmann <marcus@g10code.de>

\* data.c (gpgme\_data\_read, gpgme\_data\_write): Retry on EINTR.

2008-03-06 Marcus Brinkmann <marcus@g10code.de>

\* key.c (\_gpgme\_key\_add\_sig): Terminate UID in case SRC is NULL. Reported by Marc Mutz.

2008-03-05 Marcus Brinkmann <marcus@g10code.de>

\* decrypt.c (release\_op\_data): Release OPD->result.recipients.

\* encrypt.c (release\_op\_data): Release invalid\_recipient.

2008-02-15 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgconf.c (gpgconf\_read): Fix end-of-line handline.

2008-02-14 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_spawn): Add arg R\_PID to return the pid.

\* posix-io.c (\_gpgme\_io\_spawn): Ditto.

\* w32-glib-io.c (\_gpgme\_io\_spawn): Ditto.

\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Ditto.

\* priv-io.h (\_gpgme\_io\_spawn): Adjust prototyp and change all callers.

\* runpgg.c (start): Call \_gpgme\_allow\_set\_foreground\_window.

\* w32-util.c (\_gpgme\_allow\_set\_foreground\_window): New.

\* posix-util.c (\_gpgme\_allow\_set\_foreground\_window): New.

\* engine-gpgsm.c (default\_inq\_cb): New.

(gpgsm\_new) [W32]: Enable pinentry notifications.

(status\_handler): Handle inquiries.

2008-01-30 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelineio.cpp: New version by Frank Osterfeld, fixes race condition.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_input\_enc): Rename to ...

(map\_data\_enc): ... this. Also change all callers.

(gpgsm\_encrypt, gpgsm\_export, gpgsm\_export\_ext, gpgsm\_genkey)

(gpgsm\_sign): Set encoding for output.

2008-01-28 Werner Koch <wk@g10code.com>

\* keylist.c (gpgme\_get\_key): Skip duplicated keys. Fixes bug 876.

2008-01-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgconf.c (gpgconf\_config\_load\_cb): Fix program\_name field.

2008-01-10 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelineio.cpp: New version from Frank Osterfeld.

\* engine-gpgconf.c (gpgconf\_config\_load\_cb2): Handle the flag NO\_ARG\_DESC.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (gpgconf\_components): New variable.
- (main\_sources): Add gpgconf.c.
- \* gpgme.h (gpgme\_protocol\_t): New protocol GPGME\_PROTOCOL\_GPGCONF.
- (gpgme\_conf\_level\_t, gpgme\_conf\_type\_t, gpgme\_conf\_arg\_t)
- (gpgme\_conf\_opt\_t, gpgme\_conf\_comp\_t, gpgme\_conf\_arg\_new)
- (gpgme\_conf\_arg\_release, gpgme\_conf\_opt\_change)
- (gpgme\_conf\_release, gpgme\_op\_conf\_load, gpgme\_op\_conf\_save): New types.
- \* gpgconf.c, engine-gpgconf.c: New files.
- \* engine.h: (\_gpgme\_engine\_op\_conf\_load, (\_gpgme\_engine\_op\_conf\_save): New prototypes.
- \* op-support.c (\_gpgme\_op\_reset): Ignore not implemented locale function.
- \* posix-util.c (\_gpgme\_get\_gpgconf\_path): New function.
- \* w32-util.c (\_gpgme\_get\_gpgconf\_path): New function.
- \* engine-gpgsm.c: (\_gpgme\_engine\_ops\_gpgsm): Add stubs for conf\_load and conf\_save.
- \* runpgg.c: (\_gpgme\_engine\_ops\_gpg): Add stubs for conf\_load and conf\_save.
- \* gpgme.def: Add new gpgconf related interfaces.
- \* libgpgme.vers: Likewise.
- \* util.h (\_gpgme\_get\_gpgconf\_path): New prototype.
- \* gpgme.h (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_GPGCONF.
- \* engine-backend.h (\_gpgme\_engine\_ops\_gpgconf): New prototype. (struct engine\_ops): Add members for conf\_load and conf\_save.
- \* engine.c (engine\_ops): Add \_gpgme\_engine\_ops\_gpgconf. (\_gpgme\_engine\_op\_conf\_load, (\_gpgme\_engine\_op\_conf\_save): New functions. (gpgme\_get\_engine\_info): Allow protocol GPGME\_PROTOCOL\_GPGCONF.

2007-11-28 Marcus Brinkmann <marcus@g10code.de>

- \* w32-util.c (\_gpgme\_get\_gpg\_path, \_gpgme\_get\_gpgsm\_path): Search for installation directory. Remove old fallback default.
- (find\_program\_in\_inst\_dir): New function.

2007-11-26 Werner Koch <wk@g10code.com>

- \* engine-gpgsm.c (struct engine\_gpgsm): Add field INLINE\_DATA and always reset it before calling start.
- (gpgsm\_new): Clear it.
- (status\_handler): Implement it.
- (gpgsm\_getauditlog) [USE\_DESCRIPTOR\_PASSING]: Use INLINE\_DATA.

2007-11-23 Werner Koch <wk@g10code.com>

- \* op-support.c (\_gpgme\_op\_reset): Implement a no-reset flag.

\* getauditlog.c (getauditlog\_start): Use that flag.

2007-11-20 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_parse\_inv\_recp): Add new reason code 11.

2007-11-22 Werner Koch <wk@g10code.com>

\* gpgme.h (gpgme\_op\_getauditlog\_start, gpgme\_op\_getauditlog): New.

\* libgpgme.vers: Ditto.

\* gpgme.def: Ditto.

\* getauditlog.c: New.

\* engine-backend.h (struct engine\_ops): Add member GETAUDITLOG.

\* engine-gpgsm.c (gpgsm\_getauditlog): New.

(\_gpgme\_engine\_ops\_gpgsm): Insert new function.

(gpgsm\_new): Try to enable audit log support.

\* runpg.c (\_gpgme\_engine\_ops\_gpg): Insert dummy entry.

2007-11-12 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld.

2007-10-11 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld.

2007-10-09 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld and Marc Mutz.

2007-10-05 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp, w32-qt-io.cpp: New versions from Frank Osterfeld.

2007-10-04 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.h, kdpipelinedevice.cpp, kdpipelinedevice.moc, w32-qt-io.cpp: New versions from Frank Osterfeld.

2007-10-02 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp, kdpipelinedevice.moc: New versions.

\* w32-qt-io.cpp (\_gpgme\_io\_fd2str): Print actual\_fd if available.

(\_gpgme\_io\_dup): Only acquire a reference, do not actually dup.

Submitted by Frank Osterfeld.

- \* priv-io.h, engine-gpgsm.c: Add comments.
- \* w32-qt-io.cpp (\_gpgme\_io\_select): Remove code handling frozen FDs.
- \* w32-glib-io.c (\_gpgme\_io\_close): Always dereference the channel, even if not primary.
- (\_gpgme\_io\_dup): Acquire a reference. Replace unused implementation by assertion.

2007-09-28 Werner Koch <wk@g10code.com>

- \* engine-gpgsm.c (iocb\_data\_t): Add SERVER\_FD\_STR.
- (gpgsm\_new): Set it.
- (gpgsm\_set\_fd): Use it.
  
- \* w32-glib-io.c (find\_channel): Add a new primary flag.
- (\_gpgme\_io\_close): Close channel only if primary.
- (\_gpgme\_io\_dup): Put newfd into the table as shallow copy.
  
- \* priv-io.h (struct io\_select\_fd\_s): Remove member FROZEN.
- \* w32-io.c (\_gpgme\_io\_select): Ditto.
- \* w32-glib-io.c (\_gpgme\_io\_select): Ditto.
  
- \* posix-io.c (\_gpgme\_io\_select): Ditto.
- \* runpgg.c (read\_status): Ditto.
- \* wait.c (fd\_table\_put): Ditto.
  
- \* runpgg.c (gpg\_io\_event): Add tracing.
- (start): Use gpg\_io\_event for sending the start event.
- \* engine-gpgsm.c (gpgsm\_io\_event): Add tracing.
- (start): Use gpgsm\_io\_event for sending the start event.
- \* wait.c (\_gpgme\_add\_io\_cb, \_gpgme\_run\_io\_cb): Add tracing.

2007-09-28 Marcus Brinkmann <marcus@g10code.de>

- \* kdpipelinedevice.moc, w32-qt-io.cpp, kdpipelinedevice.cpp: New versions from Frank Osterfeld.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

- \* w32-glib-io.c (\_gpgme\_io\_spawn),
- w32-qt-io.cpp (\_gpgme\_io\_spawn), w32-io.c (\_gpgme\_io\_spawn): Close the process handle, return 0.
  
- \* gpgme.h (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_UNKNOWN.
- \* gpgme.c (gpgme\_get\_protocol\_name): Implement support for GPGME\_PROTOCOL\_UNKNOWN.
  
- \* kdpipelinedevice.h: Fix last change.

\* w32-glib-io.c (\_gpgme\_io\_pipe), w32-qt-io.c (\_gpgme\_io\_pipe), w32-io.c (\_gpgme\_io\_pipe), posix-io.c (\_gpgme\_io\_pipe): Fix debug output.

2007-09-25 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c, keylist.c: Include <sys/types.h>.

\* kdpipelineio.h: Use namespace \_gpgme\_.

\* kdpipelineio.cpp: Use namespace \_gpgme\_.

[Q\_OS\_WIN32 && NOMINMAX]: Do not define NOMINMAX again.

\* w32-qt-io.cpp: Change namespace of KDPipelineIODevice to \_gpgme\_::KDPipelineIODevice.

2007-09-17 Werner Koch <wk@g10code.com>

\* runpg.c (gpg\_new): Make robust against undefined ttyname or ttytype.

2007-09-14 Werner Koch <wk@g10code.com>

\* data-mem.c (gpgme\_data\_release\_and\_get\_mem): Fix tracing bug.

2007-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_release): Call gpgme\_sig\_notation\_clear.

2007-09-13 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (gpg\_new): Handle return value of \_gpgme\_getenv (fixes small memory leak).

2007-09-07 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_qt\_la\_SOURCES): Move moc\_kdpipelineio.cpp to EXTRA\_DIST, as this is only included by another file (it's more like a header file than a cpp file, but automake doesn't know that).

\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Fix several cast errors and typos.

\* w32-io.c (\_gpgme\_io\_write): Use TRACE\_SYSRES instead of TRACE\_SYS. (libgpgme\_qt\_la\_LIBADD): Add QT4\_CORE\_LIBS, not QT4\_CORE\_LIB.

\* kdpipelineio.h, kdpipelineio.cpp, moc\_kdpipelineio.cpp, kdpipelineio.moc, w32-qt-io.c: New files.

\* Makefile.am (lplib\_gpgme\_extra): Rename to lplib\_gpgme\_glib.

(lplib\_gpgme\_qt): New variable.

(lib\_LTLIBRARIES): Add \$(lplib\_gpgme\_qt).

(libpgpme\_qt\_la\_SOURCES): New variable.  
(AM\_CPPFLAGS): Add @QT4\_CORE\_INCLUDES@  
(AM\_CFLAGS): Add @QT4\_CORE\_CFLAGS@.  
(libpgpme\_qt\_la\_LDFLAGS, libpgpme\_qt\_la\_DEPENDENCIES)  
(libpgpme\_qt\_la\_LIBADD): New variables.

\* sema.h (struct critsect\_s): Rename "private" to "priv" to make C++ users happy. Change users.  
\* posix-sema.c (\_gpgme\_sema\_cs\_enter, \_gpgme\_sema\_cs\_leave) (\_gpgme\_sema\_cs\_destroy): Likewise.  
\* w32-sema.c (critsect\_init, \_gpgme\_sema\_cs\_enter) (\_gpgme\_sema\_cs\_leave, \_gpgme\_sema\_cs\_destroy): Likewise.  
\* w32-glib-io.c (gpgme\_get\_giochannel): Change return type to void\*.  
(gpgme\_get\_fdptr): New function.  
\* w32-io.c (gpgme\_get\_fdptr): New function  
\* gpgme.def: Add gpgme\_get\_fdptr.

2007-08-22 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_write): Return early if COUNT is zero.  
(writer): Remove superfluous check.

2007-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Move include of gpg-error.h out of extern "C".

2007-08-07 Werner Koch <wk@g10code.com>

\* gpgme.h (struct \_gpgme\_signature): Add member CHAIN\_MODEL.  
\* verify.c (parse\_trust): Set Chain\_MODEL.

2007-08-02 Werner Koch <wk@g10code.com>

\* w32-glib-io.c (\_gpgme\_io\_spawn): Use DETACHED\_PROCESS flag.  
\* w32-io.c (\_gpgme\_io\_spawn): Ditto.  
(\_gpgme\_io\_write): Map ERROR\_NO\_DATA to EPIPE.  
\* debug.c (\_gpgme\_debug): Enable assuan logging.  
(\_gpgme\_debug\_subsystem\_init): New.  
\* version.c (do\_subsystem\_inits): Disable assuan logging and initialize the debug system.  
(gpgme\_check\_version): Do not trace before the subsystems are initialized.

2007-07-17 Marcus Brinkmann <marcus@g10code.de>

\* debug.c: Include <errno.h> and "debug.h".  
(\_gpgme\_debug): Save and restore ERRNO.

(TOHEX): New macro.

(\_gpgme\_debug\_buffer): New function.

\* conversion.c, data-compat.c, data-mem.c, data.c, engine-gpgsm.c, gpgme.c, keylist.c, posix-io.c, runpgg.c, sign.c, version.c, w32-io.c, wait.c: Replace DEBUG macros by TRACE\_\* variants. In most of these files, add many more tracepoints.

2007-07-16 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (status\_handler): Do not send BYE here.

\* w32-io.c (struct reader\_context\_s, struct writer\_context\_s): New members REFCOUNT.

(create\_reader, create\_writer): Initialize C->refcount to 1.

(destroy\_reader, destroy\_writer): Only destroy if C->refcount drops to 0.

(find\_reader, find\_writer, kill\_reader, kill\_writer): Beautify.

\* priv-io.h (\_gpgme\_io\_dup): New prototype.

\* posix-io.c (\_gpgme\_io\_dup): New function.

\* w32-io.c (\_gpgme\_io\_dup): Likewise.

\* w32-glib-io.c (\_gpgme\_io\_dup): Likewise.

\* engine-gpgsm.c (start): Reverting to version 2007-07-10.

2007-07-13 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c (user\_read, user\_write, user\_seek): Set errno and return -1 instead returning the error code directly.

\* data-compat.c (old\_user\_seek): Likewise.

\* gpgme.c (gpgme\_sig\_notation\_add): Return error properly.

\* Revert the "close\_notify\_handler" returns int stuff. Always close in the \_gpgme\_io\_close implementations.

\* engine-gpgsm.c (status\_handler): Try to terminate the connection in case of error.

\* w32-io.c (\_gpgme\_io\_read): Return C->error\_code in ERRNO.

(\_gpgme\_io\_write): Likewise.

\* priv-io.h (\_gpgme\_io\_set\_close\_notify): Change type of HANDLER to \_gpgme\_close\_notify\_handler.

(\_gpgme\_close\_notify\_handler): New type.

(\_gpgme\_io\_dup): Remove prototype.

\* posix-io.c (notify\_table, \_gpgme\_io\_set\_close\_notify): Change type of HANDLER to \_gpgme\_close\_notify\_handler\_t.

(\_gpgme\_io\_close): Do not close the FD if handler returns 0.

(\_gpgme\_io\_dup): Remove function.

\* w32-io.c (notify\_table, \_gpgme\_io\_set\_close\_notify,

\_gpgme\_io\_close): Change type of HANDLER to

\_gpgme\_close\_notify\_handler\_t.

(\_gpgme\_io\_close): Do not close the FD if handler returns 0.  
(\_gpgme\_io\_dup): Remove function.  
\* w32-glib-io.c (\_gpgme\_io\_dup): Remove function.  
(\_gpgme\_io\_set\_close\_notify, notify\_table): Change type of HANDLER to \_gpgme\_close\_notify\_handler\_t.  
(\_gpgme\_io\_close): Do not close the FD if handler returns 0.  
\* runpg.c (close\_notify\_handler): Change return type to int, return 1.  
\* engine-gpgsm.c (close\_notify\_handler): Change return type to int, return 0 for status FD and 1 for all other FDs.  
(start): Do not duplicate the status FD.

2007-07-12 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am: Replace implicit rule by suffix rule. Add SUFFIXES for that.

2007-07-12 Werner Koch <wk@g10code.com>

\* version.c (do\_subsystem\_inits) [W32]: Make sure that the socket system has been started.

2007-07-10 Marcus Brinkmann <marcus@g10code.de>

\* priv-io.h (\_gpgme\_io\_dup): New prototype.  
\* posix-io.c (\_gpgme\_io\_dup): New function.  
\* w32-io.c (\_gpgme\_io\_dup): Likewise.  
\* w32-glib-io.c (\_gpgme\_io\_dup): Likewise.  
\* engine-gpgsm.c (start): Use \_gpgme\_dup() instead of dup().

2007-07-08 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c [HAVE\_W32\_SYSTEM]: Enable the bunch of the file.  
\* funopen.c (funopen): Rename to \_gpgme\_funopen.

2007-04-30 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Fix error handling for ttyname\_r.  
\* runpg.c (gpg\_new): Likewise.  
Submitted by Stephen Tether.

2007-02-26 Werner Koch <wk@g10code.com>

\* verify.c (op\_data\_t): New element PLAINTEXT\_SEEN.  
(\_gpgme\_verify\_status\_handler): Return an error if more than one plaintext has been seen.  
(parse\_error): New arg SET\_STATUS. Also detect it based on an ERROR status (gpg > 1.4.6).

2007-01-26 Werner Koch <wk@g10code.com>

- \* w32-io.c (build\_commandline): Fixed stupid quoting bug.
- \* w32-glib-io.c (build\_commandline): Ditto.
  
- \* runpgg.c (gpg\_set\_locale): Avoid dangling pointer after free.
  
- \* gpgme-config.in: New options --get-gpg and --get-gpgsm.

2007-01-18 Marcus Brinkmann <marcus@g10code.de>

- \* data.h (\_gpgme\_data\_get\_fd): Add prototype.
- (gpgme\_data\_get\_fd\_cb): New type.
- (struct \_gpgme\_data\_cbs): New member get\_fd.
- \* data.c (\_gpgme\_data\_get\_fd): New function.
- \* data-fd.c (fd\_get\_fd): New function.
- (fd\_cbs): Add fd\_get\_fd.
- \* data-stream.c (stream\_get\_fd): New function.
- (stream\_cbs): Add stream\_get\_fd.
- \* data-mem.c (mem\_cbs): Add NULL for get\_fd callback.
- \* data-user.c (user\_cbs): Likewise.
- \* engine-gpgsm.c (gpgsm\_set\_fd) [USE\_DESCRIPTOR\_PASSING]: Try to short-cut by passing the data descriptor directly.

2007-01-17 Marcus Brinkmann <marcus@g10code.de>

- \* w32-io.c (build\_commandline): Quote all command line arguments.
- \* w32-glib-io.c (build\_commandline): Likewise.

2007-01-10 Werner Koch <wk@g10code.com>

- \* ttyname\_r.c (ttyname\_r) [W32]: Return a dummy name.

2007-01-08 Werner Koch <wk@g10code.com>

- \* version.c (do\_subsystem\_inits): Do assuan init only if building with Assuan.
- \* setenv.c: Include assuan-def.h only if building with Assuan support.
  
- \* op-support.c (\_gpgme\_op\_reset): Set LC\_MESSAGES only if defined.
- \* engine-gpgsm.c (gpgsm\_set\_locale): Ditto.
- \* runpgg.c (gpg\_set\_locale): Ditto.

2006-12-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_set\_protocol): Shut down the engine when switching protocols.

(gpgme\_ctx\_set\_engine\_info): Likewise for engine info.

\* engine.h (\_gpgme\_engine\_reset): New function prototype.

\* engine.c (\_gpgme\_engine\_reset): New function.

\* engine-backend.h (struct engine\_ops): New member RESET.

\* runpgg.c (\_gpgme\_engine\_ops\_gpg): Add NULL for reset function.

\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm)

[USE\_DESCRIPTOR\_PASSING]: Add gpgsm\_reset for reset.

(\_gpgme\_engine\_ops\_gpgsm) [!USE\_DESCRIPTOR\_PASSING]: Add NULL for reset function.

(gpgsm\_reset) [USE\_DESCRIPTOR\_PASSING]: New function.

\* op-support.c (\_gpgme\_op\_reset): Try to use the engine's reset function if available.

\* engine-gpgsm.c (gpgsm\_new): Move code to dup status\_fd to ... (start): ... here.

\* posix-io.c (\_gpgme\_io\_recvmsg, \_gpgme\_io\_sendmsg): New functions.

  

\* engine.h (\_gpgme\_engine\_new): Remove arguments lc\_ctype and lc\_messages from prototype.

(\_gpgme\_engine\_set\_locale): New prototype.

\* engine.c (\_gpgme\_engine\_set\_locale): New function.

\* op-support.c (\_gpgme\_op\_reset): Call \_gpgme\_engine\_set\_locale.

\* engine-backend.h (struct engine\_ops): Add new member SET\_LOCALE. Remove arguments lc\_messages and lc\_ctype from member NEW.

\* engine-gpgsm.c (struct engine\_gpgsm): New members lc\_ctype\_set and lc\_messages\_set.

(gpgsm\_new): Remove lc\_messages and lc\_ctype arguments.

(gpgsm\_set\_locale): New function.

(\_gpgme\_engine\_ops\_gpgsm): Add gpgsm\_set\_locale.

\* runpgg.c (struct engine\_gpg): Add new members lc\_messages and lc\_ctype.

(gpg\_release): Release lc\_messages and lc\_ctype if set.

(gpg\_new): Remove lc\_messages and lc\_ctype arguments.

(gpg\_set\_locale): New function.

(\_gpgme\_engine\_ops\_gpg): Add gpg\_set\_locale.

(add\_arg): Implement in terms of:

(add\_arg\_ext): New function.

(start): Set lc-messages and lc-ctype arguments here.

2006-12-03 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (struct engine\_gpgsm): Move members input\_fd\_server, output\_fd\_server, message\_fd\_server to ... (iocb\_data): ... here (as server\_fd).

(close\_notify\_handler): Reset tags as well.

(gpgsm\_new): Implement support for descriptor

passing.

(fd\_type\_t): New type.

(gpgsm\_clear\_fd): New function. Use it instead of \_gpgsm\_io\_close for unused communication channels.

(gpgsm\_set\_fd): Rewritten to support descriptor passing. All relevant callers adjusted as well (previously of \_gpgme\_io\_close).

2006-12-02 Marcus Brinkmann <marcus@g10code.de>

\* version.c: Include "assuan.h".

(do\_subsystem\_inits): Call assuan\_set\_assuan\_err\_source.

2006-12-01 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_real\_la\_SOURCES): Rename to main\_sources.

(libgpgme\_la\_SOURCES, libgpgme\_pthread\_la\_SOURCES, libgpgme\_glib\_la\_SOURCES, libgpgme\_pth\_la\_SOURCES): Add \$(main\_sources).

(libgpgme\_la\_DEPENDENCIES, libgpgme\_la\_LIBADD, libgpgme\_pthread\_la\_DEPENDENCIES, libgpgme\_pthread\_la\_LIBADD, libgpgme\_pth\_la\_DEPENDENCIES, libgpgme\_pth\_la\_LIBADD, libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_glib\_la\_LIBADD): Remove libgpgme-real.la.

(noinst\_LTLIBRARIES): Removed.

(libgpgme\_glib\_la\_CFLAGS, libgpgme\_pth\_la\_CFLAGS): Removed.

(AM\_CFLAGS): New variable.

2006-11-30 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Replace AssuanError with gpg\_error\_t and ASSUAN\_CONTEXT with assuan\_context\_t.

2006-11-29 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Check return value of assuan\_pipe\_connect.

\* runpg.c: Include <unistd.h>.

(gpg\_new): Support --display, --ttyname, --ttytype, --lc-ctype and --lc-messages. Fixes issue 734.

2006-10-24 Marcus Brinkmann <marcus@g10code.de>

\* trustlist.c (gpgme\_op\_trustlist\_next): Return error if OPD is NULL.

2006-10-23 Marcus Brinkmann <marcus@g10code.de>

\* wait-global.c (gpgme\_wait): Unlock CTX\_LIST\_LOCK while calling \_gpgme\_engine\_io\_event().

\* keylist.c (gpgme\_op\_keylist\_next): Return error if OPD is NULL.

2006-09-25 Marcus Brinkmann <marcus@g10code.de>

\* data-mem.c (gpgme\_data\_release\_and\_get\_mem): Release the data object properly.

2006-09-22 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (keylist\_colon\_handler): Move debug output after initialising KEY.

2006-07-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (Options): Add NETLIBS.

\* Makefile.am (libgpgme\_la\_LIBADD, libgpgme\_pthread\_la\_LIBADD, libgpgme\_pth\_la\_LIBADD, libgpgme\_glib\_la\_LIBADD): Add NETLIBS.

\* runpg.c (read\_status): Fix comparison disguising as an assignment.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_set\_locale): Remove conditional on HAVE\_W32\_SYSTEM, and just check for LC\_MESSAGES.

2006-07-16 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (read\_status): Strip potential carriage return.

\* genkey.c (get\_key\_parameter): Skip potential carriage return.

\* version.c (\_gpgme\_get\_program\_version): Strip potential carriage return.

\* data.c (gpgme\_data\_set\_file\_name): Allow to clear the file name by passing NULL.

2006-06-22 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_get\_key): Also clone the engine info.

2006-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (cflags\_pth): Revert accidental removal of pthread support with last change.

2006-02-28 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (O\_BINARY) [!O\_BINARY]: New macro.  
(\_gpgme\_io\_pipe): Open pipes in binary mode.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (gpgme\_engine\_check\_version): Reimplemented to allow checking the version correctly even after changing the engine information. Bug reported by Stphane Corthsy.

\* runpg.c (read\_colon\_line): Invoke colon preprocess handler if it is set.

(colon\_preprocessor\_t): New type.

(struct engine\_gpg): New member colon.preprocess\_fnc.

(gpg\_keylist\_preprocess): New function.

\* keylist.c (keylist\_colon\_handler): Allow short key IDs.

2006-02-15 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (create\_writer): Make C->have\_data a manually reset event.

(writer): Move code from end of if block to beginning, so it is also run the first time.

(\_gpgme\_io\_write): Move assert check after error check. Reset the is\_empty event, and also do it eagerly.

(\_gpgme\_io\_select): Unconditionally wait for the is\_empty event.

2006-01-26 Werner Koch <wk@g10code.com>

\* w32-util.c (\_gpgme\_get\_conf\_int): New.

\* posix-util.c (\_gpgme\_get\_conf\_int): New.

\* w32-io.c (get\_desired\_thread\_priority): New.

(create\_reader, create\_writer): Use it here.

2006-01-04 Werner Koch <wk@g10code.com>

\* debug.h (\_gpgme\_debug\_srcname): New. Use it with the debug macros.

\* w32-glib-io.c (\_gpgme\_io\_set\_nonblocking): Add debug statements. Disable error return for failed nonblocking call.

2006-01-03 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (\_gpgme\_io\_close): Only close fd if there is no channel for it.

2005-12-31 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (find\_channel): Set channel to unbuffered.  
(\_gpgme\_io\_select): Fix debug output.

2005-12-23 Werner Koch <wk@g10code.com>

\* gpgme.h (struct \_gpgme\_signature): Append field PKA\_ADDRESS.  
\* verify.c (release\_op\_data, \_gpgme\_verify\_status\_handler): Set  
this field.

2005-12-20 Werner Koch <wk@g10code.com>

\* gpgme.h (gpgme\_status\_code\_t): Added GPGME\_STATUS\_PKA\_TRUST\_BAD  
and GPGME\_STATUS\_PKA\_TRUST\_GOOD.  
(struct \_gpgme\_signature): New field pka\_trust.  
\* verify.c (\_gpgme\_verify\_status\_handler): Set pka\_trust.

2005-12-06 Werner Koch <wk@g10code.com>

\* keylist.c (keylist\_colon\_handler): Store fingerprints of the  
subkeys. Reset the secret flag of subkeys for stub secret keys.  
(NR\_FIELDS): Bumped up to 16

2005-11-27 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_set\_engine\_info): Use new\_file\_name in  
engine\_get\_version invocation. Reported by Stphane Corthsy.

2005-11-24 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (\_gpgme\_io\_fd2str): Remove debug printf.

2005-11-18 Werner Koch <wk@g10code.com>

\* w32-glib-io.c: Include glib.h before windows to avoid a symbol  
shadowing warning.  
(find\_channel): Better use g\_io\_channel\_win32\_new\_fd instead of  
the autodetection function g\_io\_channel\_unix\_new.  
(\_gpgme\_io\_select): Rewritten. It is now a fully working select  
implementation.

2005-11-18 Marcus Brinkmann <marcus@g10code.de>

\* priv-io.h (\_gpgme\_io\_fd2str): New prototype.  
\* posix-io.c (\_gpgme\_io\_fd2str): New function.  
\* w32-io.c (\_gpgme\_io\_fd2str): New function.  
\* runpgg.c: Use this new function.  
\* w32-glib-io.c (\_gpgme\_io\_fd2str): Rewrote the file handle code

again. Two's company, three's the musketeers.

\* w32-glib-io.c: Rewrote the file handle code. We don't create system fds for every handle (doesn't work for inherited handles), but we create pseudo fds in a private namespace that designate a handle and potentially a giochannel.

2005-11-18 Werner Koch <wk@g10code.com>

\* versioninfo.rc.in: Set file version to LT-version + Svn-revision.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c: New file.  
\* gpgme.def (gpgme\_get\_giochannel): Add symbol.  
\* Makefile.am (system\_components) [HAVE\_DOSISH\_SYSTEM]: Remove w32-io.c.  
(lplib\_gpgme\_extra): New variable.  
(lib\_LTLIBRARIES): Add \$(lplib\_gpgme\_extra).  
(system\_components\_not\_extra): New variable.  
(libgpgme\_la\_SOURCES, libgpgme\_pthread\_la\_SOURCES, libgpgme\_pth\_la\_SOURCES): Add \$(system\_components\_not\_extra).  
(libgpgme\_glib\_la\_LDFLAGS, libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_glib\_la\_LIBADD, libgpgme\_glib\_la\_CFLAGS) [BUILD\_W32\_GLIB]: New variables.  
\* gpgme-config.in (glib): New option.  
\* gpgme.m4 (AM\_PATH\_GPGME\_GLIB): New macro.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

\* priv-io.h (\_gpgme\_io\_waitpid, \_gpgme\_io\_kill): Removed.  
\* w32-io.c (\_gpgme\_io\_waitpid, \_gpgme\_io\_kill): Removed.  
\* posix-io.c (\_gpgme\_io\_kill): Removed.  
(\_gpgme\_io\_waitpid): Declare static.

2005-10-24 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_spawn): Don't minimize window, hide it.

2005-10-21 Werner Koch <wk@g10code.com>

\* Makefile.am: Fixed cut+paste problem

2005-10-20 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am: Build versioninfo.lo, not versioninfo.o. Also, fix the whole mess.

2005-10-16 Marcus Brinkmann <marcus@g10code.de>

\* `rungpg.c` (`gpg_edit`): Don't add a key argument if in card edit mode.

2005-10-06 Marcus Brinkmann <marcus@g10code.de>

\* `Makefile.am` (`gpgme.dll` `gpgme.dll.a`): Use `$(srcdir)` for `gpgme.def`.

\* `gpgme.h` (`gpgme_free`): New prototype.

\* `data-mem.c` (`gpgme_free`): New function.

\* `libgpgme.vers` (`GPGME_1.1`): Add `gpgme_free`.

\* `gpgme.def`: Add `gpgme_free`.

2005-10-02 Marcus Brinkmann <marcus@g10code.de>

\* `util.h` (`_gpgme_decode_percent_string`): Add new argument `BINARY` to prototype.

\* `verify.c` (`parse_notation`): Likewise for invocation.

\* `conversion.c` (`_gpgme_decode_percent_string`): Likewise to declaration. If set, do not replace `\0` characters with a printable string.

\* `gpgme.h` (`struct _gpgme_key_sig`): New field notations.

\* `ops.h` (`_gpgme_parse_notation`): New prototype.

\* `sig-notation.c` (`_gpgme_parse_notation`): New function.

\* `key.c` (`gpgme_key_unref`): Free all signature notations.

\* `keylist.c` (`op_data_t`): New member `tmp_keysig`.

(`finish_key`): Clear `OPD->tmp_keysig`.

\* `gpgme.c` (`gpgme_set_keylist_mode`): Remove check.

\* `rungpg.c` (`gpg_keylist`): Support listing signature notations.

(`gpg_keylist_ext`): Likewise.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

\* `engine.h` (`_gpgme_set_engine_info`): Add prototype.

\* `engine-backend.h` (`struct engine_ops`): Change return type of `get_file_name()` to `const char *` to silence gcc warning.

\* `engine.c` (`engine_get_file_name`): Change return type to `const char *` to silence gcc warning.

(`gpgme_get_engine_info`): Use transitional variable to go from `const char *` to `char *` to silence gcc warning.

(`_gpgme_set_engine_info`): Likewise.

\* `engine-gpgsm.c` (`struct engine_gpgsm`): Change type of `LINE` to `char *` to silence gcc warning.

(`gpgsm_new`): Make `ARGV` a pointer to `const char`.

(`status_handler`): Change type of `SRC`, `END`, `DST`, `ALINE` and `NEWLINE` to `char *` to silence gcc warning.

\* gpgme.def: Add gpgme\_data\_set\_file\_name,  
gpgme\_data\_get\_file\_name, gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_add and gpgme\_sig\_notation\_get.  
\* libgpgme.vers: Add gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_add and gpgme\_sig\_notation\_get.  
\* Makefile.am (libgpgme\_real\_la\_SOURCES): Add sig-notation.c.  
\* context.h (struct gpgme\_context): New field sig\_notations.  
\* gpgme.h (struct \_gpgme\_sig\_notation): New member value\_len and  
critical.  
(GPGME\_SIG\_NOTATION\_CRITICAL): New symbol.  
(gpgme\_sig\_notation\_flags\_t): New type.  
(gpgme\_sig\_notation\_add, gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_get): New prototypes.  
\* ops.h (\_gpgme\_sig\_notation\_create, \_gpgme\_sig\_notation\_free):  
New prototypes.  
\* sig-notation.c (\_gpgme\_sig\_notation\_free): New file.  
\* verify.c (parse\_notation): Use support functions.  
(release\_op\_data): Likewise.  
\* runpg.c (append\_args\_from\_sig\_notations): New function.  
(gpg\_encrypt\_sign, gpg\_sign): Call it.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

\* data.h (struct gpgme\_data): New member file\_name.  
\* data.c (gpgme\_data\_set\_filename): New function.  
(\_gpgme\_data\_release): Free DH->filename if necessary.  
(gpgme\_data\_get\_filename): New function.  
\* runpg.c (gpg\_encrypt): Set filename option.  
(gpg\_encrypt\_sign): Likewise.  
(gpg\_sign): Likewise.  
\* libgpgme.vers (GPGME\_1.1): Add gpgme\_data\_set\_file\_name and  
gpgme\_data\_get\_file\_name.  
  
\* decrypt.c, verify.c, gpgme.h: Replace plaintext\_filename with  
file\_name.

2005-09-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_key): Add field is\_qualified.  
(struct \_gpgme\_subkey): Likewise.  
\* keylist.c (set\_subkey\_capability, set\_mainkey\_capability): Set  
field is\_qualified.

2005-09-23 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_pipe): Removed use of environment variable  
again.

(create\_reader, create\_writer): Set thread priority higher.

2005-09-19 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_pipe): New environment variable to change the size of the pipe buffer.

2005-09-13 Werner Koch <wk@g10code.com>

\* ath.c: Changes to make it work under W32.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_la\_SOURCES): Set to ath.h and ath.c.  
(ath\_pth\_src, ath\_pthread\_src): Removed.  
(w32\_o\_files): Replace ath-compat.o with ath.o.  
(libgpgme\_pth\_la\_CFLAGS): New variable.  
\* ath-compat.c, ath-pthread-compat.c, ath-pth-compat.c: Removed.  
\* ath.h (ath\_pthread\_available, ath\_pth\_available): Removed.  
(ath\_init) [!\_ATH\_EXT\_SYM\_PREFIX]: Do not define macro.  
(struct ath\_ops, ath\_init) [\_ATH\_COMPAT]: Removed.  
(\_ATH\_COMPAT): Macro removed.  
\* posix-sema.c (\_gpgme\_sema\_subsystem\_init): Do not call \_gpgme\_ath\_init.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (release\_op\_data): Do not free opd->tmp\_uid.

2005-09-07 Werner Koch <wk@g10code.com>

\* w32-io.c (build\_commandline): Quote argv[0].

2005-08-26 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (command\_handler): Use \_gpgme\_io\_write instead of write.

\* edit.c (command\_handler): Do not depend on PROCESSED being available.

\* engine.h (engine\_command\_handler\_t): Add new argument processed.

\* ops.h (\_gpgme\_passphrase\_command\_handler\_internal): Rename prototype to ...

(\_gpgme\_passphrase\_command\_handler): ... this one.

\* passphrase.c (\_gpgme\_passphrase\_command\_handler\_internal):  
Rename to ...

(\_gpgme\_passphrase\_command\_handler): ... this one.

\* edit.c (command\_handler): Add new argument processed. Remove

local variable with the same name. Always return processed as true.

\* `runpg.c` (`command_handler`): Send a newline character if the handler did not.

2005-08-26 Werner Koch <wk@g10code.com>

\* `w32-util.c` (`read_w32_registry_string`): Updated from code used by GnuPG. This allows for expanding strings and features the implicit fallback key.

(`w32_shgetfolderpath`, `find_program_at_standard_place`): New.

(`_gpgme_get_gpg_path`, `_gpgme_get_gpgsm_path`): With no registry entry, locate the programs at the standard place.

(`dlopen`, `dlsym`, `dlclose`): New, so that we can keep on using what we are accustomed to.

\* `debug.c` (`debug_init`): Use `PATHSEP_C` so that under W32 a semicolon is used which allows us to create files with drive letters.

\* `w32-io.c` (`_gpgme_io_read`, `_gpgme_io_write`): Print content in debug mode too.

2005-07-27 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`gpgme_status_code_t`): Add `GPGME_STATUS_PLAINTEXT`.

(`struct _gpgme_op_decrypt_result`): New member `plaintext_filename`.

(`struct _gpgme_op_verify_result`): Likewise.

\* `ops.h` (`_gpgme_parse_plaintext`): Add prototype.

\* `op-support.c` (`_gpgme_parse_plaintext`): New function.

\* `decrypt.c` (`release_op_data`): Release

`OPD->result.plaintext_filename`.

(`_gpgme_decrypt_status_handler`): Handle `GPGME_STATUS_PLAINTEXT`.

\* `verify.c` (`release_op_data`): Release

`OPD->result.plaintext_filename`.

(`_gpgme_verify_status_handler`): Handle `GPGME_STATUS_PLAINTEXT`.

2005-08-08 Werner Koch <wk@g10code.com>

\* `util.h` (`stpcpy`): Renamed to ..

(`_gpgme_stpcpy`): .. this and made inline. This avoids duplicate definitions when linking statically.

\* `stpcpy.c`: Removed.

2005-08-19 Werner Koch <wk@g10code.com>

\* `gpgme.def`: New.

\* `versioninfo.rc.in`: New.

\* Makefile.am: Adds support for building a W32 DLL.

\* ttyname\_r.c (ttyname\_r) [W32]: Return error.

\* ath-compat.c [W32]: select and co are not yet supported; return error.

\* data-stream.c (stream\_seek): Use ftell if ftello is not available.

2005-07-26 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_get\_key): Allow key IDs.

2005-06-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Only call GPGME\_CONFIG if found.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_signature): New members pubkey\_algo and hash\_algo.

\* verify.c (parse\_valid\_sig): Parse pubkey and hash algo numbers.

(parse\_new\_sig): Parse pubkey, hash algo and timestamp for ERRSIG.

(\_gpgme\_decrypt\_status\_handler): Fix last change.

\* gpgme.h (struct \_gpgme\_recipient): New structure.

(gpgme\_recipient\_t): New type.

(struct \_gpgme\_op\_decrypt\_result): Add member recipients.

\* decrypt.c (op\_data\_t): New member last\_recipient\_p.

(\_gpgme\_op\_decrypt\_init\_result): Initialize last\_recipient\_p.

(parse\_enc\_to): New function.

(\_gpgme\_decrypt\_status\_handler): Handle status ENC\_TO and NO\_SECKEY.

\* wait-global.c (gpgme\_wait): Break out of the fd processing loop after an error.

Reported by Igor Belyi <gpgme@katehok.ac93.org>.

2005-06-02 Marcus Brinkmann <marcus@g10code.de>

\* wait.h (\_gpgme\_run\_io\_cb): New prototype.

\* wait.c (gpgme\_run\_io\_cb): New function.

\* wait-global.c (gpgme\_wait): Call it.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Likewise.

\* wait-private.c (\_gpgme\_wait\_on\_condition): Likewise.

2005-06-02 Werner Koch <wk@g10code.com>

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Take care of

GPGME\_STATUS\_NEED\_PASSPHRASE\_PIN.

(\_gpgme\_passphrase\_command\_handler\_internal): Also act on the key "passphrase.pin.ask".

\* gpgme.h: Added status codes GPGME\_STATUS\_SIG\_SUBPACKET, GPGME\_STATUS\_NEED\_PASSPHRASE\_PIN, GPGME\_STATUS\_SC\_OP\_FAILURE, GPGME\_STATUS\_SC\_OP\_SUCCESS, GPGME\_STATUS\_CARDCTRL, GPGME\_STATUS\_BACKUP\_KEY\_CREATED.

2005-05-28 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c: Include <errno.h>.

2005-05-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_new): Set the CTX->include\_certs default to the default.

2005-05-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_select): Fix loop increment.

2005-05-05 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c (user\_release): Only call user hook if provided.  
(user\_seek): Return EBADF if no user hook is provided.  
(user\_read): Likewise.  
(user\_write): Likewise.

2005-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GPGME\_INCLUDE\_CERTS\_DEFAULT): New macro.  
\* engine-gpgsm.c (gpgsm\_sign): Send the include-certs option after the reset, just for cleanliness, and do not sent it at all if the default is requested.  
\* gpgme.c (gpgme\_set\_include\_certs): Allow to use GPGME\_INCLUDE\_CERTS\_DEFAULT.

2005-04-21 Werner Koch <wk@g10code.com>

\* verify.c (calc\_sig\_summary): Set the key revoked bit.

2005-04-14 Marcus Brinkmann <marcus@g10code.de>

\* wait-global.c (gpgme\_wait): Use LI->ctx when checking a context in the list, not the user-provided CTX.  
Reported by Igor Belyi <gpgme@katehok.ac93.org>.

\* wait-global.c (gpgme\_wait): If no context is found, and we should not hang, set \*status to 0 and return NULL.  
Reported by Igor Belyi <gpgme@katehok.ac93.org>.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* data.h (EOPNOTSUPP) [\_WIN32]: Remove definition.  
\* data.c (EOPNOTSUPP) [HAVE\_W32\_SYSTEM]: Remove definition.  
(gpgme\_data\_read, gpgme\_data\_write, gpgme\_data\_seek): Return ENOSYS instead EOPNOTSUPP.  
\* data-compat.c (EOPNOTSUPP) [HAVE\_W32\_SYSTEM]: Remove definition.  
(gpgme\_error\_to\_errno): Map GPG\_ERR\_NOT\_SUPPORTED to ENOSYS.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* io.h: Rename to ...  
\* priv-io.h: ... this.  
\* Makefile.am (libgpgme\_real\_la\_SOURCES): Change io.h to priv-io.h.  
\* data.c, engine-gpgsm.c, posix-io.c, runpgg.c, version.c, w32-io.c, wait-private.c, wait-global.c, wait-user.c, wait.c:  
Change all includes of "io.h" to "priv-io.h"

2005-03-09 Werner Koch <wk@g10code.com>

\* w32-util.c (\_gpgme\_get\_gpg\_path, \_gpgme\_get\_gpgsm\_path): Do not cast away type checks.  
\* io.h [W32]: Do not include stdio.h. If it is needed do it at the right place.  
\* data.h [W32]: Removed kludge for EOPNOTSUP.  
\* data.c, data-compat.c [W32]: Explicitly test for it here.

Replaced use of \_WIN32 by HAVE\_W32\_SYSTEM except for public header files.

2005-03-07 Timo Schulz <twoaday@g10code.de>

\* gpgme.h: [\_WIN32] Removed ssize\_t typedef.  
\* ath.h: [\_WIN32] Added some (dummy) types.  
\* io.h: [\_WIN32] include stdio.h.  
\* data.h: [\_WIN32] Define EOPNOTSUPP.  
\* w32-io.c [\_WIN32] (\_gpgme\_io\_subsystem\_init): New.  
\* gpgme.c [\_WIN32] (gpgme\_set\_locale): Disabled.

2004-12-12 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_set\_engine\_info): Fix assertion.

2004-12-11 Marcus Brinkmann <marcus@g10code.de>

\* util.h [HAVE\_CONFIG\_H && HAVE\_TTYNAME\_R] (ttyname\_r): Define prototype.

\* ttyname\_r.c: New file.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* putc\_unlocked.c, funopen.c: I just claim copyright on these files and change their license to LGPL, because they are totally trivial wrapper functions.

\* isascii.c: Change copyright notice to the one from ctype/ctype.h in the GNU C Library (CVS Head 2004-10-10), where isascii is defined as a macro doing exactly the same as the function in this file.

\* memrchr.c: Update from the GNU C Library (CVS Head 2001-07-06).

\* stpcpy.c: Update from the GNU C Library (CVS Head 2004-10-10).

\* ath.c, ath-compat.c, ath.h, ath-pth.c, ath-pth-compat.c, ath-pthread.c, ath-pthread-compat.c, context.h, conversion.c, data.c, data-compat.c, data-fd.c, data.h, data-mem.c, data-stream.c, data-user.c, debug.c, debug.h, decrypt.c, decrypt-verify.c, delete.c, edit.c, encrypt.c, encrypt-sign.c, engine-backend.h, engine.c, engine-gpgsm.c, engine.h, error.c, export.c, genkey.c, get-env.c, gpgme.c, gpgme.h, import.c, io.h, key.c, keylist.c, mkstatus, Makefile.am, ops.h, op-support.c, passphrase.c, posix-io.c, posix-sema.c, posix-util.c, progress.c, runpgg.c, sema.h, sign.c, signers.c, trust-item.c, trustlist.c, util.h, verify.c, version.c, w32-io.c, w32-sema.c, w32-util.c, wait.c, wait-global.c, wait.h, wait-private.c, wait-user.c: Change license to LGPL.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* libgpgme.vers (GPGME\_1.1): New version.

\* engine-backend.h (struct engine\_ops): Add argument FILE\_NAME to member get\_version(). Add arguments FILE\_NAME and HOME\_DIR to member new(). Change return type of get\_file\_name and get\_version to char \*.

\* engine-gpgsm.c (gpgsm\_get\_version): Change return type to char pointer. Do not cache result.

(gpgsm\_new): Add file\_name and home\_dir argument, and use them instead of the defaults, if set.

\* runpgg.c (struct engine\_gpg): New member file\_name.

(gpg\_get\_version): Change return type to char pointer, and do not cache result.

(gpg\_release): Free gpg->file\_name.

(gpg\_new): Take new arguments file\_name and home\_dir. Set the --homedir argument if HOME\_DIR is not NULL. Set gpg->file\_name.

(start): Use gpg->file\_name instead \_gpgme\_get\_gpg\_path, if set.

\* engine.h (\_gpgme\_engine\_info\_copy, \_gpgme\_engine\_info\_release): New prototypes.

(\_gpgme\_engine\_new): Change first argument to gpgme\_engine\_info\_t info.

\* engine.c: Include <assert.h>.

(gpgme\_get\_engine\_info): Set \*INFO within the lock. Move ENGINE\_INFO and ENGINE\_INFO\_LOCK to ....

(engine\_info, engine\_info\_lock): ... here. New static variables.

(engine\_get\_version): Add file\_name argument to get\_version invocation. Change return type to char pointer.

(gpgme\_engine\_check\_version): Rewritten to free() the return value of engine\_get\_version after using it.

(\_gpgme\_engine\_info\_release): New function.

(gpgme\_get\_engine\_info): Rewritten.

(\_gpgme\_engine\_info\_copy): New function.

(\_gpgme\_set\_engine\_info): New function.

(gpgme\_set\_engine\_info): New function.

(\_gpgme\_engine\_new): Change first argument to gpgme\_engine\_info\_t info, and use that.

\* gpgme.h (struct \_gpgme\_engine\_info): Change type of file\_name and version to char \* (remove the const). New member home\_dir.

(gpgme\_set\_engine\_info, gpgme\_ctx\_get\_engine\_info, gpgme\_ctx\_set\_engine\_info): New prototypes.

\* context.h (struct gpgme\_context): New member engine\_info.

\* gpgme.c (gpgme\_new): Allocate CTX->engine\_info.

(gpgme\_release): Deallocate CTX->engine\_info.

(gpgme\_ctx\_get\_engine\_info, gpgme\_ctx\_set\_engine\_info): New functions.

\* op-support.c (\_gpgme\_op\_reset): Look for correct engine info and pass it to \_gpgme\_engine\_new.

\* version.c (gpgme\_check\_version): Adjust to \_gpgme\_compare\_versions returning an int.

(\_gpgme\_compare\_versions): Return an int value, not a const char pointer.

\* ops.h (\_gpgme\_compare\_versions): Same for prototype.

2004-10-03 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_trust): If no reason is provided, set SIG->validity\_reason to 0.

(calc\_sig\_summary): Set GPGME\_SIGSUM\_CRL\_TOO\_OLD if appropriate.

2004-10-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Return 0 if ERR is 0.

(start): Call map\_assuan\_error on return value of  
assuan\_write\_line.

2004-10-05 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_data\_lookup): Use char pointer for  
pointer arithmetic.

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Implement the --api-version check.

\* runpgp.c (read\_status): Move the polling of the output data pipe  
to just before removing the command fd, from just before adding  
it. This avoids buffering problems.

\* data.c (\_gpgme\_data\_inbound\_handler): Use \_gpgme\_io\_read, not  
read, to improve debug output.

2004-09-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GPGME\_IMPORT\_NEW, GPGME\_IMPORT\_UID, GPGME\_IMPORT\_SIG,  
GPGME\_IMPORT\_SUBKEY, GPGME\_IMPORT\_SECRET,  
(GPGME\_KEYLIST\_MODE\_LOCAL, GPGME\_KEYLIST\_MODERN\_EXTERN,  
GPGME\_KEYLIST\_MODE\_SIGS, GPGME\_KEYLIST\_MODE\_VALIDATE): Change from  
enum to macros.

(gpgme\_keylist\_mode\_t): Define as unsigned int.

(gpgme\_key\_t): Change type of keylist\_mode to  
gpgme\_keylist\_mode\_t.

2004-09-23 Marcus Brinkmann <marcus@g10code.de>

\* data.c (\_gpgme\_data\_outbound\_handler): Close the file descriptor  
if we get an EPIPE.

\* data-stream.c (stream\_seek): Call ftello and return the current  
offset.

\* data.h (struct gpgme\_data): Change type of data.mem.offset to  
off\_t.

\* data.c (gpgme\_data\_seek): Check dh->cbs->seek callback, not read  
callback. If SEEK\_CUR, adjust the offset by the pending buffer  
size. Clear pending buffer on success.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Add copyright notice.

2004-08-18 Marcus Brinkmann <marcus@g10code.de>

\* passphrase.c (`_gpgme_passphrase_status_handler`): Always run the status handler.

2004-08-17 Marcus Brinkmann <marcus@g10code.de>

\* `rungpg.c` (`build_argv`): Use `--no-sk-comment`, not `--no-comment`.

2004-06-23 Marcus Brinkmann <marcus@g10code.de>

\* `key.c` (`_gpgme_key_append_name`): Make sure tail points to the byte following the uid.  
(`_gpgme_key_add_sig`): Likewise. Don't use `calloc`, but `malloc` and `memset`.

2004-06-02 Marcus Brinkmann <marcus@g10code.de>

\* `libgpgme.vers`: Remove C-style comment, which is not supported by older `binutils`.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme-config.in` (Options): Support `--api-version`.

\* `libgpgme.vers`: List all `gpgme` symbols under version `GPGME_1.0`.

\* `decrypt.c` (`_gpgme_decrypt_status_handler`): Fix last change.

\* `verify.c` (`parse_error`): Likewise.

\* `verify.c` (`parse_error`): Do not skip location of where token.

\* `gpgme.h` (`gpgme_status_code_t`): Add `GPGME_STATUS_REVKEYSIG`.

\* `verify.c` (`_gpgme_verify_status_handler`): Add handling of `GPGME_STATUS_REVKEYSIG`.  
(`parse_trust`): Likewise.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`struct _gpgme_decrypt_result`): New fields `wrong_key_usage` and `_unused`.

\* `decrypt.c` (`_gpgme_decrypt_status_handler`): Don't skip over character after a matched string, as in a protocol error this could skip over the trailing binary zero.  
Handle `decrypt.keyusage` error notifications.

\* `gpgme.h` (`struct _gpgme_key`): New member `keylist_mode`.

\* `keylist.c` (`keylist_colon_handler`): Set the `keylist_mode` of `KEY`.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_signature): Change member WRONG\_KEY\_USAGE to unsigned int. Same for member \_unused.

\* keylist.c (set\_mainkey\_trust\_info): Rewritten.  
(set\_subkey\_capability): Handle 'd' (disabled).  
(set\_mainkey\_capability): Rewritten.

2004-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Quote first argument to AC\_DEFUN.

2004-04-21 Werner Koch <wk@gnupg.org>

\* key.c (gpgme\_key\_unref): Allow passing NULL like free does.  
The rule of least surprise.

2004-04-15 Werner Koch <wk@gnupg.org>

\* verify.c (prepare\_new\_sig, \_gpgme\_verify\_status\_handler): Remove unused result.signatures items.

\* keylist.c (gpgme\_get\_key): Return an error if FPR is NULL.

2004-04-08 Werner Koch <wk@gnupg.org>

\* verify.c (\_gpgme\_verify\_status\_handler): Ignore the error status if we can't process it.

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Backed out yesterday's hack. It is not any longer required.

2004-04-07 Werner Koch <wk@gnupg.org>

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Hack to cope with meaningless error codes from the verify status function.

2004-04-05 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_STATUS\_NEWSIG.

\* verify.c (parse\_error): Compare only the last part of the where token.

(prepare\_new\_sig): New.

(parse\_new\_sig): Use prepare\_new\_sig when required.

(\_gpgme\_verify\_status\_handler): Handle STATUS\_NEWSIG.

\* engine-gpgsm.c (gpgsm\_keylist\_ext): Send with-validation option. Fixed pattern construction.  
(status\_handler): Add debugging output.

2004-03-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Protect \_only\_ tty related code with isatty(). Submitted by Bernhard Herzog.

2004-03-11 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Protect all tty related code with isatty().

\* runpgp.c (gpg\_cancel): Set GPG->fd\_data\_map to NULL after releasing it.

\* engine-gpgsm.c (gpgsm\_cancel): Only call assuan\_disconnect if GPGSM->assuan\_ctx is not NULL. Set it to NULL afterwards.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in: Do not emit include and lib directory for prefix "/usr" or "".

2004-03-03 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (gpgsm\_export\_ext): Properly insert a space between patterns.

2004-02-18 Werner Koch <wk@gnupg.org>

\* gpgme-config.in: Ignore setting of --prefix.

2004-02-25 Marcus Brinkmann <marcus@g10code.de>

\* runpgp.c (gpg\_cancel): New function.

(gpg\_release): Call it here.

(\_gpgme\_engine\_ops\_gpg): Add it here.

\* engine-gpgsm.c (gpgsm\_cancel): Fix last change.

2004-02-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_cancel): New function.

\* engine-backend.h (struct engine\_ops): New member cancel.

\* engine.h (\_gpgme\_engine\_cancel): New prototype.

\* engine.c (\_gpgme\_engine\_cancel): New function.

\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Add new member cancel.

(gpgsm\_cancel): New function.

(gpgsm\_release): Use it.

\* runpgg.c (\_gpgme\_engine\_ops\_gpg): Add new member cancel.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_KEYLIST\_MODE\_VALIDATE.

\* engine-gpgsm.c (gpgsm\_keylist): Send this to gpgsm.

2004-02-15 Werner Koch <wk@gnupg.org>

\* memrchr.c (memrchr): Fixed implementation. Problem pointed out by Adriaan de Groot.

2004-02-01 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (build\_argv): Use --no-comment, not --comment "".

\* data-compat.c (gpgme\_data\_new\_from\_filepart): Call fseeko if available.

\* data-stream.c (stream\_seek): Likewise.

2004-01-16 Werner Koch <wk@gnupg.org>

\* conversion.c (\_gpgme\_map\_gnupg\_error): Handle numerical codes as used by GnuPG 1.9.x

2004-01-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_key\_sig): Fix comment on REVOKED.

2004-01-12 Werner Koch <wk@gnupg.org>

\* sign.c: Include util.h for prototype of \_gpgme\_parse\_timestamp.

2003-12-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (\_GPGME\_D\_CLASS): Revert this change.

(struct \_gpgme\_key\_sig): For C++ compilers, rename class member to \_obsolete\_class. Add new member sig\_class.

(struct \_gpgme\_new\_signature): Same here.

\* key.c (gpgme\_key\_sig\_get\_ulong\_attr): Use CERTSIG->sig\_class, not CERTSIG->class.

\* keylist.c (keylist\_colon\_handler): Likewise for KEYSIG, but keep setting KEYSIG->class, too. Rename variable CLASS to SIG\_CLASS.

\* sign.c (parse\_sig\_created): Set SIG->sig\_class.

2003-12-22 Werner Koch <wk@gnupg.org>

\* gpgme.h (\_GPGME\_D\_CLASS): Kludge for C++ compatibility without changing the C API.

2003-11-19 Werner Koch <wk@gnupg.org>

\* conversion.c (\_gpgme\_parse\_timestamp): New.  
(atoi\_1, atoi\_2, atoi\_4): New.  
\* keylist.c (parse\_timestamp): Removed. Changed all callers to use the new function.  
\* verify.c (parse\_valid\_sig): Ditto. Repalced the errno check.  
\* sign.c (parse\_sig\_created): Ditto.

2003-10-31 Werner Koch <wk@gnupg.org>

\* keylist.c (parse\_timestamp): Detect ISO 8601 timestamps and try to convert them.

2003-10-10 Marcus Brinkmann <marcus@g10code.de>

\* genkey.c (get\_key\_parameter): Make a copy of the key parameters. Submitted by Miguel Coca <e970095@zipi.fi.upm.es>.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

\* data-compat.c: Include <sys/time.h> before <sys/stat.h> for broken systems.  
\* engine-gpgsm.c (map\_assuan\_error): If ERR is -1, return sensible error.  
\* io.h (\_gpgme\_io\_subsystem\_init): New prototype.  
\* posix-io.c (\_gpgme\_io\_subsystem\_init): Add function.  
(\_gpgme\_io\_spawn): Do not fixup signal handler here.  
\* version.c (do\_subsystem\_inits): Call \_gpgme\_io\_subsystem\_init.  
\* debug.c (debug\_init): Drop const qualifier from E.  
\* ath.h (struct ath\_ops): Make ADDR argument of CONNECT prototype const.  
(ath\_connect): Make ADDR argument const.  
\* ath-pthread.c (ath\_connect): Likewise.  
\* ath-pth.c (ath\_connect): Likewise.  
\* ath-compatible.c (ath\_connect): Likewise.  
\* ath.c (ath\_connect): Likewise.  
\* ath.h [HAVE\_SYS\_SELECT\_H]: Include <sys/select.h> for fd\_set.  
[!HAVE\_SYS\_SELECT\_H]: Include <sys/time.h>.

- \* conversion.c (\_gpgme\_hextobyte): Drop "unsigned" from type of SRC argument.
- \* util.h (\_gpgme\_hextobyte): Likewise for prototype.
- \* gpgme.h: Remove trailing comma in enum.
- \* runpgg.c: Do not include <time.h>, <sys/time.h>, <sys/types.h>, <signal.h>, <fcntl.h>, or "unistd.h".

2003-10-02 Marcus Brinkmann <marcus@g10code.de>

- \* engine-backend.h (struct engine\_ops): Add argument TYPE.
- \* engine.c (\_gpgme\_engine\_op\_edit): Likewise.
- \* engine.h: Likewise.
- \* runpgg.c (gpg\_edit): Likewise. Use it.
- \* edit.c (edit\_start): Likewise. Pass it on.
- (gpgme\_op\_edit\_start, gpgme\_op\_edit): Likewise.
- (gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): New functions.

2003-09-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (gpg\_strerror\_r): Change prototype to match gpg\_strerror\_r change.
- \* error.c (gpg\_strerror\_r): Likewise, also update implementation.
- \* gpgme.c (gpgme\_hash\_algo\_name): Change name of RMD160 to RIPEMD160, name of TIGER to TIGER192, name of CRC32-RFC1510 to CRC32RFC1510, and name of CRC24-RFC2440 to CRC24RFC2440.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add prototype for gpgme\_set\_locale.
- \* gpgme.h: Define macro \_GPGME\_INLINE depending on the compiler characteristics and use that instead \_\_inline\_\_.
- \* context.h (struct gpgme\_context): New members lc\_ctype and lc\_messages.
- \* gpgme.c: Include <locale.h>.
- (def\_lc\_lock, def\_lc\_ctype, def\_lc\_messages): New static variables.
- (gpgme\_set\_locale): New function.
- \* engine.c (\_gpgme\_engine\_new): Add arguments lc\_ctype and lc\_messages.
- \* engine.h (\_gpgme\_engine\_new): Likewise.
- \* engine-gpgsm.c (gpgsm\_new): Likewise.
- \* runpgg.c (gpg\_new): Likewise.
- \* engine-backend.h (struct engine\_ops): Likewise to NEW.

\* op-support.c (\_gpgme\_op\_reset): Likewise to invocation of \_gpgme\_engine\_new.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_strerror\_r): New prototype.

\* error.c (gpgme\_strerror\_r): New function.

\* get-env.c: New file.

\* util.h (\_gpgme\_getenv): Add prototype.

\* Makefile.am (libgpgme\_real\_la\_SOURCES): Add get-env.c.

\* runpg.c (build\_argv): Use \_gpgme\_getenv.

\* debug.c (debug\_init): Likewise.

\* engine-gpgsm.c (gpgsm\_new): Likewise.

(gpgsm\_new): Use ttyname\_r.

\* w32-io.c (\_gpgme\_io\_spawn): Disable debugging for now.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in: Use \$libdir, not @libdir@, for the echo command.

\* gpgme-config.in: Rewritten.

\* gpgme.m4: Rewritten.

2003-08-19 Marcus Brinkmann <marcus@g10code.de>

The ath files (ath.h, ath.c, ath-pth.c, ath-pthread.c, ath-compat.c, ath-pth-compat.c and ath-pthread-compat.c) have been updated to have better thread support, and the Makefile.am was changed to reflect that.

\* util.h [!HAVE\_FOPENCOOKIE]: Remove fopencookie declaration.

\* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Set ERR to return value of status\_fnc.

\* runpg.c (start): Return SAVED\_ERRNO, not errno.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (start): Use saved\_errno instead errno.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

\* funopen.c, putc\_unlocked.c, isascii.c, memchr.c: New files.

\* fopencookie.c: File removed.

2003-08-15 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in: Put gpg-error related flags after gpgme's.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_new\_signature): Rename member CLASS to \_OBSOLETE\_CLASS, add member CLASS with type unsigned int.

\* sign.c (parse\_sig\_created): Also set SIG->\_unused\_class for backward compatibility.

2003-08-04 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_new\_sig): Fix status parsing case.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_subkey): Add flag CAN\_AUTHENTICATE. Lower \_UNUSED to 23 bits.

(struct \_gpgme\_key): Likewise.

\* keylist.c (set\_mainkey\_capability): Support 'a' and 'A'.

(set\_subkey\_capability): Support 'a'.

\* keylist.c (gpgme\_get\_key): Check if there is more than one key listed, and return GPG\_ERR\_AMBIGUOUS\_NAME in that case.

\* util.h (\_gpgme\_decode\_c\_string): Change type of LEN argument to size\_t.

(\_gpgme\_decode\_percent\_string): Likewise.

\* conversion.c (\_gpgme\_decode\_c\_string): Likewise.

(\_gpgme\_decode\_percent\_string): Likewise.

(\_gpgme\_map\_gnupg\_error): Change type of I to unsigned int.

\* signers.c (gpgme\_signers\_clear): Likewise.

(gpgme\_signers\_enum): New unsigned variable SEQNO, set to SEQ. Use SEQNO instead SEQ.

\* wait.c (fd\_table\_put): Change type of I and J to unsigned int.

\* wait-global.c (\_gpgme\_wait\_global\_event\_cb): Change type of IDX to unsigned int.

(gpgme\_wait): Change type of I and IDX to unsigned int.

\* wait-private.c (\_gpgme\_wait\_on\_condition): Change type of IDX and I to unsigned int.

\* posix-io.c (\_gpgme\_io\_close): Cast return value of macro DIM to int to suppress gcc warning.

(\_gpgme\_io\_set\_close\_notify): Likewise.

(\_gpgme\_io\_select): Change type of I to unsigned int.

\* engine.c (gpgme\_get\_engine\_info): Change type of PROTO to unsigned int.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Change type of IDX and I to unsigned int.

2003-07-29 Marcus Brinkmann <marcus@g10code.de>

- \* decrypt-verify.c (decrypt\_verify\_status\_handler): Expand silly and wrong expression.
- \* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.
- \* encrypt.c (encrypt\_sym\_status\_handler): Likewise.
- \* sign.c (sign\_status\_handler): Likewise.
- \* verify.c (verify\_status\_handler): Likewise.
- \* decrypt.c (decrypt\_status\_handler): Likewise.
  
- \* engine.c (gpgme\_get\_engine\_info): Initialize NULL.

2003-07-23 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme-config.in (gpg\_error\_libs): Quote GPG\_ERROR\_CFLAGS and GPG\_ERROR\_LIBS when setting the corresponding variables.
- Reported by Stphane Corthisy.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (set\_recipients): Move declaration of NEWLEN to the beginning of the block.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

- \* data-mem.c (mem\_write): Copy original buffer content.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (gpgme\_user\_ids\_release, gpgme\_user\_ids\_append): Remove prototypes.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (AM\_CPPFLAGS): Add @GPG\_ERROR\_CFLAGS@.
- \* gpgme-config.in (gpg\_error\_libs, gpg\_error\_cflags): New variables. Print them.
  
- \* op-support.c (\_gpgme\_parse\_inv\_userid): Rename to \_gpgme\_parse\_inv\_recp and change to new datatype.
- \* ops.h (\_gpgme\_parse\_inv\_key): Fix prototype.
- \* gpgme.h (struct \_gpgme\_invalid\_user\_id): Rename to \_gpgme\_invalid\_key. Rename field ID to KEY.
- (gpgme\_invalid\_user\_id\_t): Rename to gpgme\_invalid\_key\_t.
- (struct \_gpgme\_op\_encrypt\_result): Here, too.
- (struct \_gpgme\_op\_sign\_result): Likewise.
- \* encrypt.c (struct op\_data): Likewise.
- (release\_op\_data): Likewise.

\* sign.c (struct op\_data): Likewise.  
(release\_op\_data): Likewise.

\* posix-io.c (\_gpgme\_io\_read): Save errno across debug calls.  
(\_gpgme\_io\_write): Likewise.  
(\_gpgme\_io\_pipe): Likewise.  
(\_gpgme\_io\_select): Likewise.

\* runpgg.c (struct engine\_gpg): Remove arg\_error.  
(add\_arg): Don't set arg\_error.  
(add\_data): Likewise.  
(start): Don't check arg\_error.  
(gpg\_new): Check return value of add\_arg.  
\* verify.c (parse\_notation): Free allocated memory at error.

2003-06-05 Marcus Brinkmann <marcus@g10code.de>

Everywhere: Use libgpg-error error codes.

\* Makefile.am (EXTRA\_DIST): Remove mkerrors.  
(BUILT\_SOURCES): Remove errors.c.  
(MOSTLYCLEANFILES): Likewise.  
(libgpgme\_la\_SOURCES): Likewise. Add error.c.  
(errors.c): Remove target.  
\* mkerrors: File removed.  
\* error.c: New file.

\* gpgme.h (gpgme\_error\_t): Change to type gpg\_error\_t.  
(gpgme\_err\_code\_t, gpgme\_err\_source\_t): New types.  
(gpgme\_err\_code, gpgme\_err\_source, gpgme\_error, gpgme\_err\_make):  
New static inline functions.  
(gpgme\_strsource, gpgme\_err\_code\_from\_errno,  
gpgme\_err\_code\_to\_errno, gpgme\_err\_make\_from\_errno,  
gpgme\_error\_from\_errno): New prototypes.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_op\_export\_start): Change second arg to const char \*.  
(gpgme\_op\_export): Likewise.  
(gpgme\_op\_export\_ext\_start): New prototype.  
(gpgme\_op\_export\_ext): Likewise.  
\* engine.h: Likewise for \_gpgme\_engine\_op\_export and  
\_gpgme\_engine\_op\_export\_ext.  
\* engine-backend.h (struct engine\_ops): Change second argument of  
prototype of export to const char \*, and add reserved int as  
third argument. Add prototype for export\_ext.  
\* engine.c (\_gpgme\_engine\_op\_export\_ext): New function.  
(\_gpgme\_engine\_op\_export): Change second argument of prototype of

export to const char \*, and add reserved int as third argument.

\* `rungpg.c` (`gpg_export`): Change second argument of prototype of export to const char \*, and add reserved int as third argument.

(`gpg_export_ext`): New function.

(`gpg_keylist_ext`): Break loop at error.

(`_gpgme_engine_ops_gpg`): Add `gpg_export_ext`.

\* `engine-gpgsm.c` (`gpgsm_export`): Change second argument of prototype of export to const char \*, and add reserved int as third argument.

(`gpgsm_export_ext`): New function.

(`_gpgme_engine_ops_gpgsm`): Add `gpgsm_export_ext`.

\* `export.c` (`export_start`): Change second argument of prototype of export to const char \*, and add reserved int as third argument.

(`gpgme_op_export_start`): Likewise.

(`export_ext_start`): New function.

(`gpgme_op_export_ext_start`): Likewise.

(`gpgme_op_export_ext`): Likewise.

\* `gpgme.h` (`gpgme_keylist_mode_t`): New type for anonymous enum.

(`gpgme_sigsum_t`): New type for anonymous enum.

\* `encrypt-sign.c` (`encrypt_sign_start`): Check for errors earlier, and return an error if RECP is not set.

\* `Makefile.am` (`libgpgme_la_SOURCES`): Remove `user-id.c`.

\* `user-id.c`: Remove file.

\* `ops.h`: Remove prototype for `_gpgme_user_ids_all_valid`.

\* `gpgme.h` (`gpgme_encrypt_flags_t`): New type.

(`gpgme_op_encrypt_start`): Change second parameter to type `gpgme_key_t[]`, and add third parameter.

(`gpgme_op_encrypt`): Likewise.

(`gpgme_op_encrypt_sign_start`): Likewise.

(`gpgme_op_encrypt_sign`): Likewise.

\* `encrypt.c` (`encrypt_start`): Likewise.

(`gpgme_op_encrypt_start`): Likewise.

(`gpgme_op_encrypt`): Likewise. Pass flags to engine.

\* `encrypt-sign.c` (`encrypt_sign_start`): Likewise.

(`gpgme_op_encrypt_sign_start`): Likewise.

(`gpgme_op_encrypt_sign`): Likewise.

\* `engine-backend.h` (`struct engine_ops`): Likewise for prototypes of `encrypt` and `encrypt_sign`.

\* `engine.h`: Likewise for prototypes of `_gpgme_engine_op_encrypt` and `_gpgme_engine_op_encrypt_sign`.

\* `engine.c` (`_gpgme_engine_op_encrypt`): Likewise.

(`_gpgme_engine_op_encrypt_sign`): Likewise.

\* `rungpg.c` (`gpg_encrypt`): Likewise.

(`gpg_encrypt_sign`): Likewise.

\* `rungpg.c` (`gpg_encrypt`): Check flags for always trust option.

\* engine-gpgsm.c (gpgsm\_encrypt): Likewise.  
(set\_recipients): Rewritten to use keys instead user IDs.  
\* runpgg.c (append\_args\_from\_recipients): Rewritten to use keys  
instead user IDs.  
\* encrypt.c (\_gpgme\_encrypt\_status\_handler): Change errors  
returned to GPGME\_Invalid\_Key and GPGME\_General\_Error.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Rename GpgsmObject to engine\_gpgsm\_t.  
(struct gpgsm\_object\_s): Rename to struct engine\_gpgsm.  
\* runpgg.c: Rename GpgObject to engine\_gpg\_t.  
(struct gpg\_object\_s): Rename to struct engine\_gpg.  
  
\* context.h (struct gpgme\_context): Change EngineObject to  
engine\_object\_t.  
(enum ctx\_op\_data\_type): Rename to ctx\_op\_data\_id\_t.  
(ctx\_op\_data\_t): New type.  
(struct gpgme\_context): Use it.  
\* ops.h (\_gpgme\_op\_data\_lookup): Use new type name.  
\* op-support.c (\_gpgme\_op\_data\_lookup): Likewise.  
\* engine.c: Rename EngineObject to engine\_t in the file. Also  
EngineStatusHandler to engine\_status\_handler\_t,  
EngineCommandHandler to engine\_command\_handler\_t and  
EngineColonLineHandler to engine\_colon\_line\_handler.  
\* runpgg.c (start): Likewise.  
\* engine-gpgsm.c: Likewise.  
\* engine-backend.h (struct engine\_ops): Likewise  
\* engine.h (struct engine\_object\_s): Rename to struct engine.  
(EngineObject): Rename to engine\_t. Also everywhere else in the  
file.  
(EngineStatusHandler): Rename to engine\_status\_handler\_t.  
(EngineColonLineHandler): Rename to engine\_colon\_line\_handler\_t.  
(EngineCommandHandler): Rename to engine\_command\_handler\_t.  
  
\* engine-gpgsm.c (gpgsm\_export): Fix bug in last change.  
  
\* Makefile.am (libgpgme\_la\_SOURCES): Remove recipient.c, add  
user-id.c.  
\* gpgme.h (gpgme\_recipients\_t): Removed.  
(gpgme\_recipients\_new, gpgme\_recipients\_release,  
gpgme\_recipients\_add\_name,  
gpgme\_recipients\_add\_name\_with\_validity, gpgme\_recipients\_count,  
gpgme\_recipients\_enum\_open, gpgme\_recipients\_enum\_read,  
gpgme\_recipients\_enum\_close): Removed.  
(gpgme\_op\_encrypt, gpgme\_op\_encrypt\_start, gpgme\_op\_encrypt\_sign,  
gpgme\_op\_encrypt\_sign\_start, gpgme\_op\_export\_start,  
gpgme\_op\_export): Change second argument to gpgme\_user\_id\_t.

(gpgme\_user\_ids\_release): New prototype.  
(gpgme\_user\_ids\_append): Likewise.  
\* ops.h (\_gpgme\_recipients\_all\_valid): Remove.  
(\_gpgme\_user\_ids\_all\_valid): Add.  
\* context.h (struct gpgme\_recipients): Removed.  
\* user-id.c: New file.  
\* recipient.c: Removed file.  
\* runpg.c (append\_args\_from\_recipients): Change last arg to gpgme\_user\_id\_t. Reimplement.  
(gpg\_encrypt): Change second arg to gpgme\_user\_id\_t.  
(gpg\_encrypt\_sign): Likewise.  
(gpg\_export): Likewise. Rewrite user ID list code.  
\* engine.c (\_gpgme\_engine\_op\_encrypt): Change second arg to gpgme\_user\_id\_t.  
(\_gpgme\_engine\_op\_encrypt\_sign): Likewise.  
(\_gpgme\_engine\_op\_export): Likewise.  
\* engine.h (\_gpgme\_engine\_op\_encrypt, \_gpgme\_engine\_op\_encrypt\_sign, \_gpgme\_engine\_op\_export): Likewise.  
\* engine-gpgsm.c (set\_recipients): Likewise. Rewrite loop code.  
(gpgsm\_encrypt): Likewise.  
(gpgsm\_export): Likewise.  
\* engine-backend.h (struct engine\_ops): Likewise for members ENCRYPT, ENCRYPT\_SIGN and EXPORT.  
\* export.c (export\_start, gpgme\_op\_export\_start, gpgme\_op\_export): Likewise.  
\* encrypt.c (encrypt\_start): Likewise. Don't check for count of recipients.  
(gpgme\_op\_encrypt\_start): Likewise.  
(gpgme\_op\_encrypt): Likewise.  
\* encrypt-sign.c (encrypt\_sign\_start): Likewise.  
(gpgme\_op\_encrypt\_sign): Likewise.  
(gpgme\_op\_encrypt\_sign\_start): Likewise.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_op\_import\_result): Add skipped\_new\_keys.  
\* import.c (parse\_import\_res): Add skipped\_new\_keys parser.  
  
\* op-support.c (\_gpgme\_parse\_inv\_userid): Add missing break statements.  
\* encrypt.c (gpgme\_op\_encrypt): Use gpgme\_error\_t instead of int.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* encrypt.c (gpgme\_op\_encrypt\_result): Use intermediate variable HOOK to avoid compiler warning. Don't ask, you don't want to know.  
(\_gpgme\_encrypt\_status\_handler): Likewise.  
(\_gpgme\_op\_encrypt\_init\_result): Likewise.

- \* decrypt.c (gpgme\_op\_decrypt\_result): Likewise.
- (\_gpgme\_decrypt\_status\_handler): Likewise.
- (\_gpgme\_op\_decrypt\_init\_result): Likewise.
- \* verify.c (gpgme\_op\_verify\_result): Likewise.
- (\_gpgme\_verify\_status\_handler): Likewise.
- (\_gpgme\_op\_verify\_init\_result): Likewise.
- \* edit.c (edit\_status\_handler): Likewise.
- (command\_handler): Likewise.
- (edit\_start): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_result): Likewise.
- (genkey\_status\_handler): Likewise.
- (genkey\_start): Likewise.
- \* import.c (gpgme\_op\_import\_result): Likewise.
- (import\_status\_handler): Likewise.
- (\_gpgme\_op\_import\_start): Likewise.
- \* trustlist.c (gpgme\_op\_trustlist\_next): Likewise.
- (\_gpgme\_op\_trustlist\_event\_cb): Likewise.
- (gpgme\_op\_trustlist\_start): Likewise.
- \* keylist.c (gpgme\_op\_keylist\_result): Likewise.
- (keylist\_colon\_handler): Likewise.
- (keylist\_status\_handler): Likewise.
- (\_gpgme\_op\_keylist\_event\_cb): Likewise.
- (gpgme\_op\_keylist\_start): Likewise.
- (gpgme\_op\_keylist\_ext\_start): Likewise.
- (gpgme\_op\_keylist\_next): Likewise.
- \* passphrase.c (\_gpgme\_passphrase\_status\_handler): Likewise.
- (\_gpgme\_passphrase\_command\_handler\_internal): Likewise.
- \* sign.c (gpgme\_op\_sign\_result): Likewise.
- (\_gpgme\_sign\_status\_handler): Likewise.
- (\_gpgme\_op\_sign\_init\_result): Likewise.
  
- \* passphrase.c (\_gpgme\_passphrase\_command\_handler\_internal): Fix access to pointer type.

2003-05-26 Marcus Brinkmann <marcus@g10code.de>

- \* engine.h (EngineCommandHandler): Change last argument to int fd.
- \* gpgme.h (gpgme\_passphrase\_cb\_t): Rewritten to take parts of the description and fd.
- (gpgme\_edit\_cb\_t): Change last argument to int fd.
- \* ops.h (\_gpgme\_passphrase\_command\_handler\_internal): New prototype.
- \* passphrase.c: Include <assert.h>.
- (op\_data\_t): Rename userid\_hint to uid\_hint, remove last\_pw\_handle.
- (release\_op\_data): Check values before calling free.
- (\_gpgme\_passphrase\_status\_handler): Likewise.
- (\_gpgme\_passphrase\_command\_handler\_internal): New function.
- (\_gpgme\_passphrase\_command\_handler): Rewritten.
- \* edit.c (edit\_status\_handler): Pass -1 as fd argument.

(command\_handler): Update prototype. New variable processed. Use it to store return value of `_gpgme_passphrase_command_handler_internal` which is now used instead `_gpgme_passphrase_command_handler`. Use it also to check if we should call the user's edit function. Pass fd to user's edit function.

\* `runpgg.c` (struct `gpg_object_s`): Change type of `cmd.cb_data` to `void *`.

(`gpg_release`): Check value before calling `free`. Do not release `cmd.cb_data`.

(`command_cb`): Function removed.

(`command_handler`): New function. Thus we don't use a data object for command handler stuff anymore, but handle it directly. This allows proper error reporting (cancel of passphrase requests, for example). Also all callbacks work via direct writes to the file descriptor (so that passphrases are not kept in insecure memory).

(`gpg_set_command_handler`): Rewritten to use even more ugly hacks.

(`read_status`): Check `cmd.keyword` before calling `free`. Install `command_handler` as the I/O callback handler with GPG as private data.

\* `runpgg.c` (`gpg_new`): Add `--enable-progress-filter` to `gpg` invocation.

\* `decrypt-verify.c` (`_gpgme_op_decrypt_verify_start`): Rename to `decrypt_verify_start`.

(`gpgme_op_decrypt_verify_start`): Call `decrypt_verify_start`.

(`gpgme_op_decrypt_verify`): Likewise.

\* `verify.c` (`verify_status_handler`): New function that also calls progress status handler.

(`_gpgme_op_verify_start`): Set status handler to `verify_status_handler`. Rename to (`verify_start`).

(`gpgme_op_verify_start`): Call `verify_start`.

(`gpgme_op_verify`): Likewise.

\* `encrypt.c` (`encrypt_status_handler`): New function.

(`_gpgme_encrypt_sym_status_handler`): Call progress status handler. Make static. Rename to `encrypt_sym_status_handler`.

(`encrypt_start`): Set status handler to `encrypt_sym_status_handler` or `encrypt_status_handler`.

\* `sign.c` (`sign_status_handler`): New function.

(`sign_start`): Set status handler to `sign_status_handler`.

\* `decrypt.c` (`decrypt_status_handler`): New function that also calls progress status handler.

(`decrypt_start`): Set status handler to `decrypt_status_handler`.

\* `encrypt-sign.c` (`encrypt_sign_status_handler`): Likewise.

\* `decrypt-verify.c` (`decrypt_verify_status_handler`): Call `_gpgme_progress_status_handler`.

\* `conversion.c` (`_gpgme_decode_c_string`): Add missing break

statement.

\* recipient.c (gpgme\_recipients\_add\_name\_with\_validity): Add one to buffer to allocate.

2003-05-19 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_new\_sig): Fix ERRSIG case.  
Submitted by Benjamin Lee <benjaminlee@users.sf.net>.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: The following types are renamed. The old name is kept as a deprecated typedef.

(GpgmeCtx): Rename to gpgme\_ctx\_t.  
(GpgmeData): Rename to gpgme\_data\_t.  
(GpgmeRecipients): Rename to gpgme\_recipients\_t.  
(GpgmeError): Rename to gpgme\_error\_t.  
(GpgmeDataEncoding): Rename to gpgme\_data\_encoding\_t.  
(GpgmePubKeyAlgo): Rename to gpgme\_pubkey\_algo\_t.  
(GpgmeHashAlgo): Rename to gpgme\_hash\_algo\_t.  
(GpgmeSigStat): Rename to gpgme\_sig\_stat\_t.  
(GpgmeSigMode): Rename to gpgme\_sig\_mode\_t.  
(GpgmeAttr): Rename to gpgme\_attr\_t.  
(GpgmeValidity): Rename to gpgme\_validity\_t.  
(GpgmeProtocol): Rename to gpgme\_protocol\_t.  
(GpgmeStatusCode): Rename to gpgme\_status\_code\_t.  
(GpgmeEngineInfo): Rename to gpgme\_engine\_info\_t.  
(GpgmeSubkey): Rename to gpgme\_subkey\_t.  
(GpgmeKeySig): Rename to gpgme\_keysig\_t.  
(GpgmeUserID): Rename to gpgme\_user\_id\_t.  
(GpgmePassphraseCb): Rename to gpgme\_passphrase\_cb\_t.  
(GpgmeProgressCb): Rename to gpgme\_progress\_cb\_t.  
(GpgmeEditCb): Rename to gpgme\_edit\_cb\_t.  
(GpgmeIOCb): Rename to gpgme\_io\_cb\_t.  
(GpgmeRegisterIOCb): Rename to gpgme\_register\_io\_cb\_t.  
(GpgmeRemoveIOCb): Rename to gpgme\_remove\_io\_cb\_t.  
(GpgmeEventIO): Rename to gpgme\_event\_io\_t.  
(GpgmeEventIOCb): Rename to gpgme\_event\_io\_cb\_t.  
(GpgmeIOCBs): Rename to gpgme\_io\_cbs.  
(gpgme\_io\_cbs\_t): New type.  
(GpgmeDataReadCb): Rename to gpgme\_data\_read\_cb\_t.  
(GpgmeDataWriteCb): Rename to gpgme\_data\_write\_cb\_t.  
(GpgmeDataSeekCb): Rename to gpgme\_data\_seek\_cb\_t.  
(GpgmeDataReleaseCb): Rename to gpgme\_data\_release\_cb\_t.  
(GpgmeDataCbs): Rename to gpgme\_data\_cbs.  
(gpgme\_data\_cbs\_t): New type.  
(GpgmeInvalidUserID): Rename to gpgme\_invalid\_user\_id\_t.

(GpgmeEncryptResult): Rename to gpgme\_encrypt\_result\_t.  
(GpgmeDecryptResult): Rename to gpgme\_decrypt\_result\_t.  
(GpgmeNewSignature): Rename to gpgme\_new\_signature\_t.  
(GpgmeSignResult): Rename to gpgme\_sign\_result\_t.  
(GpgmeSigNotation): Rename to gpgme\_sig\_notation\_t.  
(GpgmeSignature): Rename to gpgme\_signature\_t.  
(GpgmeVerifyResult): Rename to gpgme\_verify\_result\_t.  
(GpgmeImportStatus): Rename to gpgme\_import\_status\_t.  
(GpgmeImportResult): Rename to gpgme\_import\_result\_t.  
(GpgmeGenKeyResult): Rename to gpgme\_genkey\_result\_t.  
(GpgmeKeyListResult): Rename to gpgme\_keylist\_result\_t.  
(GpgmeTrustItem): Rename to gpgme\_trust\_item\_t.  
\* gpgme.h (gpgme\_deprecated\_error\_t): New type, swallowing macros  
GPGME\_No\_Recipients, GPGME\_Invalid\_Recipient and  
GPGME\_No\_Passphrase.  
\* data.h (struct gpgme\_data\_s): Rename to struct gpgme\_data.  
\* context.h (struct gpgme\_context\_s): Rename to struct  
gpgme\_context.  
(struct gpgme\_recipients\_s): Rename to gpgme\_recipients.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (finish\_key): Clear OPD->tmp\_uid.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_verify\_status\_handler): Return GPGME\_No\_Data  
for NODATA status without signatures.

2003-05-05 Marcus Brinkmann <marcus@g10code.de>

\* key.c (\_gpgme\_key\_append\_name): Use decoded string to parse user id.  
(\_gpgme\_key\_add\_sig): Likewise.

2003-05-04 Marcus Brinkmann <marcus@g10code.de>

\* context.h (struct gpgme\_context\_s): Remove member op\_info.

\* key.c (\_gpgme\_key\_add\_sig): Initialize SIG->uid.

\* gpgme.h (GpgmeError): Add deprecated values for  
GPGME\_Invalid\_Type and GPGME\_Invalid\_Mode.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_get\_op\_info): Remove prototype.  
\* ops.h (\_gpgme\_set\_op\_info,  
\_gpgme\_data\_release\_and\_return\_string, \_gpgme\_data\_get\_as\_string,

`_gpgme_data_append`, `_gpgme_data_append_string`,  
`_gpgme_data_append_string_for_xml`, `_gpgme_data_append_for_xml`,  
`_gpgme_data_append_percentstring_for_xml`): Likewise.  
`(_gpgme_progress_status_handler)`: Change first arg to void \*.  
\* `progress.c` (`_gpgme_progress_status_handler`): Likewise.  
\* `conversion.c`: Do not include `<string.h>`, `<errno.h>`, `<ctype.h>`,  
and `<sys/types.h>`, but `<string.h>`.  
`(_gpgme_data_append)`: Remove function.  
`(_gpgme_data_append_string)`: Likewise.  
`(_gpgme_data_append_for_xml)`: Likewise.  
`(_gpgme_data_append_string_for_xml)`: Likewise.  
`(_gpgme_data_append_percentstring_for_xml)`: Likewise.  
\* `data-mem.c` (`_gpgme_data_get_as_string`): Likewise.  
`(_gpgme_data_release_and_return_string)`: Likewise.  
\* `gpgme.c` (`gpgme_get_op_info`): Likewise.  
`(_gpgme_set_op_info)`: Likewise.  
  
\* `gpgme.h` (`struct _gpgme_key`): New structure.  
`(GpgmeKey)`: Define using `_gpgme_key`.  
`(struct _gpgme_subkey)`: New structure.  
`(GpgmeSubKey)`: New type.  
`(struct _gpgme_key_sig)`: New structure.  
`(GpgmeKeySig)`: New type.  
`(struct _gpgme_user_id)`: New structure.  
`(GpgmeUserID)`: New type.  
`(struct _gpgme_op_keylist_result)`: New structure.  
`(GpgmeKeyListResult)`: New type.  
`(gpgme_op_keylist_result)`: New function.  
`(gpgme_key_get_as_xml)`: Remove prototype.  
\* `context.h` (`struct gpgme_context_s`): Remove members `tmp_key`,  
`tmp_uid`, `key_cond` and `key_queue`.  
`(struct key_queue_item_s)`: Remove structure.  
`(struct user_id_s)`: Remove structure.  
`(struct gpgme_recipients_s)`: Replace with simple  
`GpgmeUserID` list.  
\* `gpgme.c` (`gpgme_release`): Do not release `CTX->tmp_key`.  
\* `ops.h` (`_gpgme_key_add_subkey`, `_gpgme_key_append_name`,  
`_gpgme_key_add_sig`, `_gpgme_trust_item_new`): New prototypes.  
\* `rungpg.c` (`command_cb`): Return `GpgmeError` instead int.  
New variable `ERR`. Use it to hold return value of cmd handler.  
`(gpg_delete)`: Access fingerprint of key directly.  
`(append_args_from_signers)`: Likewise.  
`(gpg_edit)`: Likewise.  
`(append_args_from_recipients)`: Use `GpgmeUserID` for recipient list.  
\* `engine-gpgsm.c`: Do not include "key.h".  
`(gpgsm_delete)`: Access fingerprint of key directly.  
`(gpgsm_sign)`: Likewise.  
`(set_recipients)`: Use `GpgmeUserID` for recipients. Invert invalid

user ID flag.

\* key.h: File removed.

\* key.c: Completely reworked to use exposed GpgmeKey data types.

\* keylist.c: Likewise.

\* recipient.c: Completely reworked to use GpgmeUserID.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_get\_key): Remove force\_update argument.

\* key-cache.c: File removed.

\* Makefile.am (libgpgme\_la\_SOURCES): Remove key-cache.c.

\* ops.h (\_gpgme\_key\_cache\_add, \_gpgme\_key\_cache\_get): Remove prototypes.

\* keylist.c (\_gpgme\_op\_keylist\_event\_cb): Don't call \_gpgme\_key\_cache\_add.

(gpgme\_get\_key): New function.

\* verify.c (gpgme\_get\_sig\_key): Remove last argument to gpgme\_get\_key invocation.

\* gpgme.h (struct \_gpgme\_trust\_item): New structure.

(GpgmeTrustItem): New type.

(gpgme\_trust\_item\_ref, gpgme\_trust\_item\_unref): New prototypes.

\* context.h (struct trust\_queue\_item\_s): Remove structure.

(struct gpgme\_context\_s): Remove trust\_queue member.

\* Makefile.am (libgpgme\_la\_SOURCES): Add trust-item.c.

\* trust-item.c: New file.

\* trustlist.c: Do not include <stdio.h> or <time.h>, but "gpgme.h".

(struct trust\_queue\_item\_s): Change to new type op\_data\_t.

(trust\_status\_handler): Change first argument to void \*.

(trust\_colon\_handler): Likewise.

(\_gpgme\_op\_trustlist\_event\_cb): Use op\_data\_t type.

(gpgme\_op\_trustlist\_start): Use op\_data\_t and rework error handling.

(gpgme\_op\_trustlist\_next): Use op\_data\_t.

(gpgme\_trust\_item\_release): Remove function.

(gpgme\_trust\_item\_get\_string\_attr): Likewise.

(gpgme\_trust\_item\_get\_int\_attr): Likewise.

\* verify.c (calc\_sig\_summary): Do not set GPGME\_SIGSUM\_SYS\_ERROR for bad signatures.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

\* context.h: Remove OPDATA\_VERIFY\_COLLECTING.

(struct gpgme\_context\_s): Remove member notation.

\* gpgme.h: Make enum for GPGME\_KEYLIST\_MODE\_\* values.

\* gpgme.h (struct \_gpgme\_sig\_notation): New structure.  
 (GpgmeSigNotation): New type.  
 (struct \_gpgme\_signature): New structure.  
 (GpgmeSignature): New type.  
 (struct \_gpgme\_op\_verify\_result): New structure.  
 (GpgmeVerifyResult): New type.  
 (gpgme\_op\_verify\_result): New prototype.  
 (gpgme\_get\_notation): Remove prototype.  
 \* ops.h (\_gpgme\_op\_verify\_init\_result): New prototype.  
 (\_gpgme\_verify\_status\_handler): Change first argument to void \*.  
 \* util.h (\_gpgme\_decode\_percent\_string, \_gpgme\_map\_gnupg\_error):  
 New prototypes.  
 \* conversion.c (\_gpgme\_decode\_percent\_string): New function.  
 (gnupg\_errors): New static global.  
 (\_gpgme\_map\_gnupg\_error): New function.  
 \* gpgme.c (gpgme\_release): Don't release CTX->notation.  
 (gpgme\_get\_notation): Remove function.  
 \* decrypt-verify.c (\_gpgme\_op\_decrypt\_verify\_start): Call  
 \_gpgme\_op\_verify\_init\_result.  
 \* verify.c: Do not include <stdio.h>, <assert.h> and "key.h", but  
 do include "gpgme.h".  
 (struct verify\_result): Replace with ...  
 (op\_data\_t): ... this type.  
 (release\_verify\_result): Remove function.  
 (release\_op\_data): New function.  
 (is\_token): Remove function.  
 (skip\_token): Remove function.  
 (copy\_token): Remove function.  
 (gpgme\_op\_verify\_result): New function.  
 (calc\_sig\_summary): Rewritten.  
 (finish\_sig): Remove function.  
 (parse\_new\_sig): New function.  
 (parse\_valid\_sig): New function.  
 (parse\_notation): New function.  
 (parse\_trust): New function.  
 (parse\_error): New function.  
 (\_gpgme\_verify\_status\_handler): Rewritten. Change first argument  
 to void \*.  
 (\_gpgme\_op\_verify\_start): Rework error handling. Call  
 \_gpgme\_op\_verify\_init\_result.  
 (gpgme\_op\_verify): Do not release or clear CTX->notation.  
 (gpgme\_get\_sig\_status): Rewritten.  
 (gpgme\_get\_sig\_string\_attr): Likewise.  
 (gpgme\_get\_sig\_ulong\_attr): Likewise.  
 (gpgme\_get\_sig\_key): Likewise.  
  
 \* gpgme.h (struct \_gpgme\_op\_decrypt\_result): New structure.  
 (GpgmeDecryptResult): New type.

(gpgme\_op\_decrypt\_result): New prototype.  
\* ops.h (\_gpgme\_op\_decrypt\_init\_result): New prototype.  
(\_gpgme\_decrypt\_status\_handler): Fix prototype.  
(\_gpgme\_decrypt\_start): Remove prototype.  
\* decrypt-verify.c: Do not include <stdio.h>, <stdlib.h>, <string.h> and <assert.h>, "util.h" and "context.h", but "gpgme.h".  
(decrypt\_verify\_status\_handler): Change first argument to void \*, and rework error handling.  
(\_gpgme\_op\_decrypt\_verify\_start): New function.  
(gpgme\_op\_decrypt\_verify\_start): Rewrite using \_gpgme\_op\_decrypt\_verify\_start.  
(gpgme\_op\_decrypt\_verify): Likewise.  
\* decrypt.c: Include <string.h>, "gpgme.h" and "util.h".  
(struct decrypt\_result): Change to typedef op\_data\_t, rewritten.  
(is\_token): Remove function.  
(release\_op\_data): New function.  
(skip\_token): Remove function.  
(gpgme\_op\_decrypt\_result): New function.  
(\_gpgme\_decrypt\_status\_handler): Change first argument to void \*. Rework error handling.  
(\_gpgme\_decrypt\_start): Rename to ...  
(decrypt\_start): ... this. Call \_gpgme\_op\_decrypt\_init\_result.  
(\_gpgme\_op\_decrypt\_init\_result): New function.  
(gpgme\_op\_decrypt\_start): Use decrypt\_start.  
(gpgme\_op\_decrypt): Likewise.

2003-04-27 Marcus Brinkmann <marcus@g10code.de>

\* encrypt-sign.c: Do not include <stddef.h>, <stdio.h>, <stdlib.h>, <string.h>, <assert.h> and "util.h", but "gpgme.h".  
(\_gpgme\_op\_encrypt\_sign\_start): Rename to ...  
(encrypt\_sign\_start): ... this.  
(gpgme\_op\_encrypt\_sign\_start): Use encrypt\_sign\_start, not \_gpgme\_op\_encrypt\_sign\_start.  
(gpgme\_op\_encrypt\_sign): Likewise.

\* gpgme.h (GpgmeEncryptResult): New data type.  
(gpgme\_op\_encrypt\_result): New prototype.  
\* ops.h (\_gpgme\_op\_encrypt\_init\_result): New prototype.  
(\_gpgme\_op\_encrypt\_status\_handler): Fix prototype.  
\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Call \_gpgme\_op\_encrypt\_init\_result.  
\* encrypt.c: Do not include <stdio.h>, <assert.h>, "util.h" and "wait.h". Include <errno.h> and "gpgme.h".  
(SKIP\_TOKEN\_OR\_RETURN): Remove macro.  
(struct encrypt\_result): Rename to ...  
(op\_data\_t): ... new data type. Rewrite for user result data.

(append\_xml\_encinfo): Remove function.

(release\_op\_data): New function.

(gpgme\_op\_encrypt\_result): New function.

(\_gpgme\_op\_encrypt\_status\_handler): Change first argument to void \*.

Rewrite result parsing.

(\_gpgme\_op\_encrypt\_sym\_status\_handler): Change first argument to void \*.

(\_gpgme\_op\_encrypt\_init\_result): New function.

(\_gpgme\_op\_encrypt\_start): Rename to ...

(encrypt\_start): ... this.

(gpgme\_op\_encrypt\_start): Use encrypt\_start, not gpgme\_op\_encrypt\_start.

(gpgme\_op\_encrypt): Likewise.

\* gpgme.h (GpgmePubKeyAlgo, GpgmeHashAlgo, GpgmeInvalidUserID, GpgmeNewSignature, GpgmeSignResult): New data types.

(gpgme\_op\_sign\_result, gpgme\_pubkey\_algo\_name, gpgme\_hash\_algo\_name): New prototypes.

\* gpgme.c (gpgme\_pubkey\_algo\_name): New function.

(gpgme\_hash\_algo\_name): Likewise.

\* ops.h (\_gpgme\_parse\_inv\_userid, \_gpgme\_op\_sign\_init\_result): New prototype.

(\_gpgme\_op\_sign\_status\_handler): Fix prototype.

\* op-support.c: Include <errno.h> and <string.h>.

(\_gpgme\_parse\_inv\_userid): New function.

\* sign.c: Include <errno.h> and "gpgme.h", but not <stdio.h>, <assert.h> and "util.h".

(SKIP\_TOKEN\_OR\_RETURN): Remove macro.

(struct sign\_result): Change to op\_data\_t type and rework it.

(release\_sign\_result): Rename to ...

(release\_op\_data): ... this and rewrite it.

(append\_xml\_info): Remove function.

(gpgme\_op\_sign\_result): New function.

(parse\_sig\_created): New function.

(\_gpgme\_sign\_status\_handler): Change first argument to void \*.

Rewrite the function to use the new result structure and functions.

(\_gpgme\_op\_sign\_init\_result): New function.

(\_gpgme\_op\_sign\_start): Rename to ...

(sign\_start): ... this. Call \_gpgme\_op\_sign\_init\_result.

(gpgme\_op\_sign\_start): Use sign\_start instead \_gpgme\_op\_sign\_start.

(gpgme\_op\_sign): Likewise.

\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Call \_gpgme\_op\_sign\_init\_result.

\* delete.c: Include <errno.h> and "gpgme.h", but not "util.h" or "key.h".

(enum delete\_problem): Move into function delete\_status\_handler.

(delete\_status\_handler): Change first argument to void \*. Parse

delete problem with strtol instead atoi. Return better error values.

(\_gpgme\_op\_delete\_start): Rename to ...

(delete\_start): ... this. Rework error handling.

(gpgme\_op\_delete\_start): Use delete\_start instead \_gpgme\_op\_delete\_start.

(gpgme\_op\_delete): Likewise.

\* gpgme.h (GpgmeDataType): Removed.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Change GPGME\_IMPORT\_PRIVATE to GPGME\_IMPORT\_SECRET.

\* import.c (parse\_import\_res): Parse unchanged field.

\* gpgme.h: New enum for GPGME\_IMPORT\_NEW, GPGME\_IMPORT\_UID, GPGME\_IMPORT\_SIG, GPGME\_IMPORT\_SUBKEY, GPGME\_IMPORT\_PRIVATE.

(GpgmeError): GPGME\_Unknown\_Reason, GPGME\_Not\_Found,

GPGME\_Ambiguous\_Specification, GPGME\_Wrong\_Key\_Usage,

GPGME\_Key\_Revoked, GPGME\_Key\_Expired, GPGME\_No\_CRL\_Known,

GPGME\_CRL\_Too\_Old, GPGME\_Policy\_Mismatch, GPGME\_No\_Secret\_Key,

GPGME\_Key\_Not\_Trusted, GPGME\_Issuer\_Missing, GPGME\_Chain\_Too\_Long,

GPGME\_Unsupported\_Algorithm, GPGME\_Sig\_Expired,

GPGME\_Bad\_Signature, GPGME\_No\_Public\_Key added as new error codes.

(struct \_gpgme\_import\_status): New structure.

(GpgmeImportStatus): New type.

(struct \_gpgme\_op\_import\_result): New structure.

(GpgmeImportResult): New type.

(gpgme\_op\_import\_result): New function.

\* import.c: Include <errno.h> and "gpgme.h", but not "util.h".

(struct import\_result): Change to type op\_data\_t.

(release\_import\_result): Rename to ...

(release\_op\_data): ... this.

(append\_xml\_impinfo): Function removed.

(gpgme\_op\_import\_result): New function.

(parse\_import): New function.

(parse\_import\_res): Likewise.

(import\_status\_handler): Change first argument to void \*. Rewrite to use new functions.

(\_gpgme\_op\_import\_start): Rework error handling.

\* edit.c: Do not include <assert.h>, "util.h", but "gpgme.h".

(edit\_resut): Change to typedef for op\_data\_t.

(edit\_status\_handler): Change first argument to void \*.

Rework error handling.

(command\_handler): Rework error handling.

(\_gpgme\_op\_edit\_start): Rename to ...

(edit\_start): ... this. Rework error handling.

(gpgme\_op\_edit\_start): Rewrite using edit\_start.

(gpgme\_op\_edit): Likewise.

\* ops.h (\_gpgme\_passphrase\_start): Remove prototype.

\* passphrase.c: Do not include <assert.h>, "util.h" or "debug.h", but "gpgme.h".

(struct passphrase\_result): Change to typedef for op\_data\_t.

(release\_passphrase\_result): Rename to release\_op\_data.

(\_gpgme\_passphrase\_status\_handler): Change first argument to void \*.

Use new op\_data\_t type.

(\_gpgme\_passphrase\_command\_handler): Use new op\_data\_t type.

(\_gpgme\_passphrase\_start): Remove function.

\* decrypt.c (\_gpgme\_decrypt\_start): Rewrite error handling. Do not call \_gpgme\_passphrase\_start, but install command handler.

\* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.

\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.

\* sign.c (\_gpgme\_op\_sign\_start): Likewise.

\* context.h (struct gpgme\_context\_s): Remove member initialized, use\_cms and help\_data\_1. Add member protocol. Make use\_armor and use\_textmode bit flags. Make keylist\_mode, include\_certs, signers\_len and signers\_size unsigned.

\* gpgme.c (gpgme\_new): Initialize CTX->protocol.

(gpgme\_set\_protocol): Do not check CTX. Use CTX->protocol.

(gpgme\_get\_protocol): Likewise.

(gpgme\_release): Do not release CTX->help\_data\_1.

\* op-support.c (\_gpgme\_op\_reset): Use CTX->protocol.

\* wait-private.c (\_gpgme\_wait\_private\_event\_cb): Remove variable CTX.

\* data.c: Do not include <assert.h>, but "gpgme.h".

(\_gpgme\_data\_inbound\_handler): Expand \_gpgme\_data\_append, because it will go. Do not assert DH.

(\_gpgme\_data\_outbound\_handler): Do not assert DH.

\* export.c: Do not include <stdlib.h>, "debug.h" and "util.h", but "gpgme.h".

(export\_status\_handler): Change type of first argument to void \*.

(\_gpgme\_op\_export\_start): Rename to ...

(export\_start): ... this. Rework error handling.

(gpgme\_op\_export\_start): Rewritten to use export\_start instead \_gpgme\_op\_export\_start.

(gpgme\_op\_export): Likewise.

\* gpgme.h (GpgmeError): Add GPGME\_Busy, GPGME\_No\_Request.

(GPGME\_No\_Recipients, GPGME\_Invalid\_Recipient,

GPGME\_No\_Passphrase): New macros.

\* key.c (gpgme\_key\_get\_string\_attr): Fix validity attribute.

- \* gpgme.h (struct \_gpgme\_op\_genkey\_result): New structure.
- (GpgmeGenKeyResult): New type.
- (gpgme\_op\_genkey): Drop last argument.
- (gpgme\_op\_genkey\_result): New function.
- \* genkey.c: Do not include "util.h", but "gpgme.h".
- (struct genkey\_result): Replace with ...
- (op\_data\_t): ... this new type.
- (release\_genkey\_result): Replace with ...
- (release\_op\_data): ... this new function.
- (gpgme\_op\_genkey\_result): New function.
- (genkey\_status\_handler): Rewritten using new op\_data\_t type.
- (get\_key\_parameter): New function.
- (\_gpgme\_op\_genkey\_start): Renamed to
- (genkey\_start): ... this and rewritten.
- (gpgme\_op\_genkey\_start): Use genkey\_start instead
- \_gpgme\_op\_genkey\_start.
- (gpgme\_op\_genkey): Rewritten. Remove FPR argument.
  
- \* context.h (struct gpgme\_context\_s): Remove member verbosity.
- \* gpgme.c (gpgme\_new): Do not set member verbosity.
- \* engine.h (\_gpgme\_engine\_set\_verbosity): Remove prototype.
- \* engine.c (\_gpgme\_engine\_set\_verbosity): Remove function.
- \* engine-backend.h (struct engine\_ops): Remove set\_verbosity.
- \* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Remove set\_verbosity member.
- \* runpgg.c (\_gpgme\_engine\_ops\_gpg): Likewise.
- (gpg\_set\_verbosity): Remove function.
- \* decrypt.c (\_gpgme\_decrypt\_start): Don't call
- \_gpgme\_engine\_set\_verbosity.
- \* delete.c (\_gpgme\_op\_delete\_start): Likewise.
- \* edit.c (\_gpgme\_op\_edit\_start): Likewise.
- \* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.
- \* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* export.c (\_gpgme\_op\_export\_start): Likewise.
- \* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.
- \* import.c (\_gpgme\_op\_import\_start): Likewise.
- \* keylist.c (gpgme\_op\_keylist\_start): Likewise.
- (gpgme\_op\_keylist\_ext\_start): Likewise.
- \* sign.c (\_gpgme\_op\_sign\_start): Likewise.
- \* verify.c (\_gpgme\_op\_verify\_start): Likewise.
  
- \* Makefile.am (libgpgme\_la\_SOURCES): Add key-cache.c.
- \* key.c (key\_cache\_initialized, key\_cache\_size,
- key\_cache\_max\_chain\_length, ): Removed.
- (struct key\_cache\_item\_s, key\_cache\_lock, key\_cache,
- key\_cache\_unused\_items, hash\_key, \_gpgme\_key\_cache\_add,

\_gpgme\_key\_cache\_get, gpgme\_get\_key): Moved to ...  
 \* key-cache.c: ... here. New file.  
 \* key.h (\_gpgme\_key\_cache\_init): Remove prototypes.  
 (\_gpgme\_key\_cache\_add, \_gpgme\_key\_cache\_get): Move to ...  
 \* ops.h: ... here.  
 \* version.c: Do not include "key.h".  
 (do\_subsystem\_inits): Do not call \_gpgme\_key\_cache\_init.

\* mkstatus: Strip trailing comma.  
 \* gpgme.h (GpgmeStatus): Pretty print.

\* gpgme.h (GpgmeError): Rename GPGME\_No\_Passphrase to  
 GPGME\_Bad\_Passphrase.  
 \* passphrase.c (\_gpgme\_passphrase\_status\_handler): Use  
 GPGME\_Bad\_Passphrase instead GPGME\_No\_Passphrase.

\* gpgme.h (GpgmeError): Rename GPGME\_No\_Recipients to  
 GPGME\_No\_UserID and GPGME\_Invalid\_Recipient to  
 GPGME\_Invalid\_UserID.  
 \* encrypt.c (\_gpgme\_encrypt\_status\_handler): Use GPGME\_No\_UserID  
 instead GPGME\_No\_Recipients and GPGME\_Invalid\_UserID instead  
 GPGME\_Invalid\_Recipient.  
 (\_gpgme\_op\_encrypt\_start): Likewise.

\* gpgme.h (GpgmeError): Remove GPGME\_Busy and GPGME\_No\_Request.  
 \* wait-user.c (\_gpgme\_wait\_user\_event\_cb): Don't clear CTX->pending.  
 \* wait-private.c (\_gpgme\_wait\_private\_event\_cb): Likewise.  
 \* wait-global.c (gpgme\_wait): Likewise.  
 \* verify.c (\_gpgme\_op\_verify\_start): Likewise.  
 (gpgme\_get\_sig\_status): Don't check pending flag.  
 (gpgme\_get\_sig\_string\_attr): Likewise.  
 (gpgme\_get\_sig\_ulong\_attr): Likewise.  
 (gpgme\_get\_sig\_key): Likewise.  
 \* op-support.c (\_gpgme\_op\_reset): Likewise.  
 \* trustlist.c (gpgme\_op\_trustlist\_start): Don't clear pending flag.  
 (gpgme\_op\_trustlist\_next): Don't check or clear pending flag.  
 (gpgme\_op\_trustlist\_end): Likewise.  
 \* sign.c (\_gpgme\_op\_sign\_start): Likewise.  
 \* context.h (struct gpgme\_context\_s): Remove member PENDING.  
 \* decrypt.c (\_gpgme\_decrypt\_start): Likewise.  
 \* delete.c (\_gpgme\_op\_delete\_start): Likewise.  
 \* edit.c (\_gpgme\_op\_edit\_start): Likewise.  
 \* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.  
 \* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.  
 \* export.c (\_gpgme\_op\_export\_start): Likewise.  
 \* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.  
 \* import.c (\_gpgme\_op\_import\_start): Likewise.  
 \* key.c (gpgme\_get\_key): Likewise.

\* keylist.c (gpgme\_op\_keylist\_start): Likewise.  
(gpgme\_op\_keylist\_ext\_start): Likewise.  
(gpgme\_op\_keylist\_next): Likewise.  
(gpgme\_op\_keylist\_end): Likewise.  
\* data-compat.c (gpgme\_error\_to\_errno): Don't convert EBUSY.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GpgmePassphraseCb): Change type to return GpgmeError,  
and add argument for returning the result string.  
(gpgme\_cancel): Remove prototype.  
\* gpgme.c (gpgme\_cancel): Remove function.  
\* context.h (struct gpgme\_context\_s): Remove member cancel.  
\* passphrase.c (\_gpgme\_passphrase\_command\_handler): Call the  
passphrase callback in the new way.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* edit.c (\_gpgme\_edit\_status\_handler): Call the progress status  
handler.

2003-02-05 Marcus Brinkmann <marcus@g10code.de>

\* wait-user.c (\_gpgme\_wait\_user\_remove\_io\_cb): Move check for no  
I/O handlers left to ...  
(\_gpgme\_user\_io\_cb\_handler): ... here.

2003-02-04 Marcus Brinkmann <marcus@g10code.de>

\* trustlist.c (trustlist\_colon\_handler): Release ITEM if name  
could not be allocated.  
(gpgme\_trust\_item\_release): Only release name if it is allocated.  
Reported by Marc Mutz <Marc.Mutz@uni-bielefeld.de>.

2003-02-04 Marcus Brinkmann <marcus@g10code.de>

\* runpgp.c (read\_status): If the status handler returns an error,  
return it.  
(status\_handler): If read\_status fails, just return the error.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (start): Handle all errors, not only most of  
them.  
(xtoi\_1, xtoi\_2): Remove macro.  
(status\_handler): Replace use of xtoi\_2 with \_gpgme\_hextobyte.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Replace ASSUAN\_Bad\_Certificate\_Path with ASSUAN\_Bad\_Certificate\_Chain. (gpgsm\_new): Use assuan\_pipe\_connect instead assuan\_pipe\_connect2.

\* util.h (DIMof): Remove macro.

\* ops.h (\_gpgme\_op\_event\_cb, \_gpgme\_op\_event\_cb\_user, \_gpgme\_data\_unread): Prototypes removed.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* types.h: File removed.

\* Makefile.am (libgpgme\_la\_SOURCES): Remove types.h.

\* io.h (struct spawn\_fd\_item\_s): Do not include "types.h".

\* key.h: Likewise.

\* context.h: Likewise.

\* engine-gpgsm.h: Likewise.

\* engine.h: Include "gpgme.h" instead "types.h". Add prototypes for EngineStatusHandler, EngineColonLineHandler and EngineCommandHandler.

(\_gpgme\_engine\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.

(\_gpgme\_engine\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.

(\_gpgme\_engine\_set\_colon\_line\_handler): Change parameter type from GpgmeColonLineHandler to EngineColonLineHandler.

\* engine-backend.h: Include "engine.h" instead "types.h".

(struct engine\_ops): Change Gpgme\*Handler parameters in members set\_command\_handler, set\_colon\_line\_handler and set\_status\_handler to Engine\*Handler.

\* engine.c (\_gpgme\_engine\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.

(\_gpgme\_engine\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.

(\_gpgme\_engine\_set\_colon\_line\_handler): Change parameter type from GpgmeColonLineHandler to EngineColonLineHandler.

\* runpg.c (struct gpg\_object\_s): Change type of member status.fnc from GpgmeStatusHandler to EngineStatusHandler. Change type of member colon.fnc from GpgmeColonLineHandler to EngineColonLineHandler. Change type of member cmd.fnc from GpgmeCommandHandler to EngineCommandHandler.

\* engine-gpgsm.c (struct gpgsm\_object\_s): Likewise.

\* runpg.c (gpg\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.

\* engine-gpgsm.c (gpgsm\_set\_status\_handler): Likewise.

(assuan\_simple\_command): Likewise.

\* runpg.c (gpg\_set\_colon\_line\_handler): Change parameter type

from GpgmeColonLineHandler to EngineColonLineHandler.  
\* engine-gpgsm.c (gpgsm\_set\_colon\_line\_handler): Likewise.  
\* runpgg.c (gpg\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.

\* engine-gpgsm.c (status\_handler): Do not close status fd at end of function.

\* ops.h (\_gpgme\_op\_data\_lookup): Add prototype.

\* op-support.c: Include <stdlib.h>.

(\_gpgme\_op\_data\_lookup): New function.

\* decrypt.c (\_gpgme\_release\_decrypt\_result): Function removed.

(struct decrypt\_result\_s): Rename to ...

(struct decrypt\_result): ... this.

(DecryptResult): New type.

(\_gpgme\_decrypt\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* sign.c (\_gpgme\_release\_sign\_result): Function removed.

(release\_sign\_result): New function.

(struct sign\_result\_s): Rename to ...

(struct sign\_result): ... this.

(SignResult): New type.

(\_gpgme\_sign\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* encrypt.c (struct encrypt\_result\_s): Rename to ...

(struct encrypt\_result): ... this.

(\_gpgme\_release\_encrypt\_result): Function removed.

(release\_encrypt\_result): New function.

(\_gpgme\_encrypt\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* verify.c (struct verify\_result\_s): Rename to ...

(struct verify\_result): ... this. Remove member next.

(VerifyResult): New type.

(\_gpgme\_release\_verify\_result): Function removed.

(release\_verify\_result): New function.

(finish\_sig): Change first argument to type VerifyResult. Diddle the type of the op\_data structure.

(add\_notation): Change first argument to type VerifyResult.

(\_gpgme\_verify\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* passphrase.c (struct passphrase\_result\_s): Rename to ...

(struct passphrase\_result): ... this. Remove member next.

(PassphraseResult): New type.

(\_gpgme\_release\_passphrase\_result): Function removed.

(release\_passphrase\_result): New function.

(\_gpgme\_passphrase\_status\_handler): Don't use test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

(\_gpgme\_passphrase\_command\_handler): Likewise.

\* keylist.c (struct keylist\_result\_s): Rename to ...

(struct keylist\_result): ... this. Remove member next.

(KeylistResult): New type.

(\_gpgme\_release\_keylist\_result): Function removed.

(release\_keylist\_result): New function.

(keylist\_status\_handler): Don't use test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* edit.c (struct edit\_result\_s): Rename to ...

(struct edit\_result): ... this. Remove member next.

(EditResult): New type.

(\_gpgme\_release\_edit\_result): Function removed.

(release\_edit\_result): New function.

(edit\_status\_handler): Don't use test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

(command\_handler): Likewise.

\* types.h (DecryptResult, SignResult, EncryptResult, PassphraseResult, ImportResult, DeleteResult, GenKeyResult, KeylistResult, EditResult): Types removed.

\* ops.h: Don't include "types.h", but "gpgme.h" and "context.h".

(test\_and\_allocate\_result): Remove macro.

(\_gpgme\_release\_decrypt\_result): Remove prototype.

(\_gpgme\_decrypt\_result): Remove prototype.

(\_gpgme\_release\_sign\_result): Remove prototype.

(\_gpgme\_release\_encrypt\_result): Remove prototype.

(\_gpgme\_release\_passphrase\_result): Remove prototype.

(\_gpgme\_release\_import\_result): Remove prototype.

(\_gpgme\_release\_delete\_result): Remove prototype.

(\_gpgme\_release\_genkey\_result): Remove prototype.

(\_gpgme\_release\_keylist\_result): Remove prototype.

(\_gpgme\_release\_edit\_result): Remove prototype.

(\_gpgme\_release\_verify\_result): Remove prototype.

\* gpgme.c (\_gpgme\_release\_result): Rewritten.

\* context.h (enum ctx\_op\_data\_type): New enum.

(struct ctx\_op\_data): New structure.

(struct gpgme\_context\_s): Replace the member result with a member op\_data.

(fail\_on\_pending\_request): Remove macro.

\* op-support.c (\_gpgme\_op\_reset): Expand macro fail\_on\_pending\_request.

\* util.h: Don't include "types.h" or "debug.h", but include "gpgme.h".

\* `runpgg.c` (`_gpgme_engine_ops_gpg`): Remove `gpg_start`.  
(`gpg_start`): Rename to ...  
(`start`): ... this function. Change arguments to `GpgObject`.  
(`gpg_decrypt`): Call `start`.  
(`gpg_edit`): Likewise.  
(`gpg_encrypt`): Likewise.  
(`gpg_encrypt_sign`): Likewise.  
(`gpg_export`): Likewise.  
(`gpg_import`): Likewise.  
(`gpg_keylist`): Likewise.  
(`gpg_keylist_ext`): Likewise.  
(`gpg_trustlist`): Likewise.  
(`gpg_verify`): Likewise.

\* `engine-gpgsm.c` (`_gpgme_engine_ops_encrypt`): Remove `gpgsm_start`.  
(`gpgsm_start`): Rename to ...  
(`struct gpgsm_object_s`): Remove member `command`.  
(`gpgsm_release`): Don't free `command`.  
(`start`): ... this function. Change arguments to `GpgsmObject` and `const char *`.  
(`gpgsm_decrypt`): Call `start`.  
(`gpgsm_delete`): Likewise.  
(`gpgsm_encrypt`): Likewise.  
(`gpgsm_export`): Likewise.  
(`gpgsm_genkey`): Likewise.  
(`gpgsm_import`): Likewise.  
(`gpgsm_keylist`): Likewise.  
(`gpgsm_keylist_ext`): Likewise.  
(`gpgsm_verify`): Likewise.

\* `decrypt.c` (`_gpgme_decrypt_start`): Don't call `_gpgme_engine_start`.  
\* `delete.c` (`_gpgme_op_delete_start`): Likewise.  
\* `edit.c` (`_gpgme_op_edit_start`): Likewise.  
\* `encrypt.c` (`_gpgme_op_encrypt_start`):  
\* `encrypt-sign.c` (`_gpgme_op_encrypt_sign_start`):  
\* `export.c` (`_gpgme_op_export_start`): Likewise.  
\* `genkey.c` (`_gpgme_op_genkey_start`): Likewise.  
\* `import.c` (`_gpgme_op_import_start`): Likewise.  
\* `keylist.c` (`gpgme_op_keylist_ext_start`): Likewise.  
(`gpgme_op_keylist_start`): Likewise.  
\* `sign.c` (`_gpgme_op_sign_start`): Likewise.  
\* `trustlist.c` (`gpgme_op_trustlist_start`): Likewise.  
\* `verify.c` (`_gpgme_op_verify_start`): Likewise.

\* `engine-backend.h` (`struct engine_ops`): Remove member `start`.

\* engine.h (\_gpgme\_engine\_start): Remove prototype.

\* engine.c (\_gpgme\_engine\_start): Remove function.

2003-01-19 Miguel Coca <mcoca@gnu.org>

\* w32-io.c (\_gpgme\_io\_select): Add missing argument in calls to  
DEBUG\_BEGIN.

\* w32-util.c: Include "sema.h".

(find\_program\_in\_registry): Change DEBUG1 to DEBUG2, fixes compilation  
error.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* types.h: Remove byte and ulong types.

\* util.h (\_gpgme\_hextobyte): Change prototype to unsigned char  
instead byte.

\* conversion.c (\_gpgme\_hextobyte): Change argument to unsigned  
char instead byte.

(\_gpgme\_decode\_c\_string): Likewise, and beautify. Also support a  
few more escaped characters. Be more strict about buffer size.

(\_gpgme\_data\_append\_percentstring\_for\_xml): Change type of SRC,  
BUF and DST to unsigned char instead byte.

\* progress.c (\_gpgme\_progress\_status\_handler): Use unsigned char  
instead byte.

\* debug.c (trim\_spaces): Likewise.

\* util.h (mk\_error): Remove macro.

\* conversion.c, data.c, data-compat.c, decrypt.c, delete.c,  
edit.c, encrypt.c, encrypt-sign.c, engine.c, engine-gpgsm.c,  
export.c, genkey.c, gpgme.c, import.c, key.c, keylist.c,  
passphrase.c, progress.c, recipient.c, runpgg.c, sign.c,  
signers.c, trustlist.c, verify.c, wait.c, wait-global.c,  
wait-private (literally everywhere): Expand the mk\_error macro.

\* context.h (wait\_on\_request\_or\_fail): Remove macro.

\* context.h (gpgme\_context\_s): Remove member ERROR.

\* types.h (GpgmeStatusHandler): Change return type to GpgmeError.

(GpgmeCommandHandler): Change return type to GpgmeError and add  
new argument RESULT.

\* gpgme.h (GpgmeIOCb): Change return type to GpgmeError.

(GpgmeEventIO): New event GPGME\_EVENT\_START.

(GpgmeIdleFunc): Remove type.

(gpgme\_register\_idle): Remove prototype.

\* data.c: Include <assert.h>.

(\_gpgme\_data\_inbound\_handler): Change return type to GpgmeError.

Return any error instead ignoring it, don't close file descriptor

on error.

(`_gpgme_data_outbound_handler`): Likewise.

\* `decrypt.c`: Do not include `<stdio.h>`, `<string.h>` and `<assert.h>`.

(`_gpgme_decrypt_status_handler`): Change return type to `GpgmeError`. Return error instead setting `ctx->error`. Return success at end of function.

(`gpgme_op_decrypt`): Don't work around the old kludge anymore.

\* `decrypt-verify.c` (`decrypt_verify_status_handler`): Change return type to `GpgmeError`. Return possible errors.

\* `delete.c`: Do not include `<stdio.h>`, `<string.h>`, `<time.h>` and `<assert.h>`.

(`delete_status_handler`): Change return type to `GpgmeError`. Return error instead setting `ctx->error`. Return success at end of function.

\* `edit.c`: Do not include `<stdio.h>` and `<string.h>`.

(`_gpgme_edit_status_handler`): Change type to `GpgmeError`, make static and rename to ...

(`edit_status_handler`): ... this. Return error directly.

(`command_handler`): Change return type to `GpgmeError`, add result argument. Return error directly.

\* `encrypt.c` (`status_handler_finish`): Remove function.

(`_gpgme_encrypt_status_handler`): Change return type to `GpgmeError`. Return error directly.

(`_gpgme_encrypt_sym_status_handler`): Likewise.

\* `encrypt-sign.c` (`encrypt_sign_status_handler`): Likewise.

\* `engine-gpgsm.c` (`close_notify_handler`): Do not signal done event anymore.

(`status_handler`): Change return type to `GpgmeError`. Diddle things around a bit to return errors directly.

(`start`): Send start event.

\* `export.c`: Do not include `<stdio.h>`, `<string.h>` and `<assert.h>`.

(`export_status_handler`): Change return type to `GpgmeError`. Don't check `ctx->error`.

\* `genkey.c`: Do not include `<stdio.h>` and `<assert.h>`.

(`genkey_status_handler`): Change return type to `GpgmeError`. Don't check `ctx->error`. Return errors directly.

\* `gpgme.c` (`_gpgme_release_result`): Do not initialize `ctx->error`.

(`_gpgme_op_event_cb`): Function removed.

(`_gpgme_op_event_cb_user`): Likewise.

\* `import.c`: Do not include `<stdio.h>`, `<string.h>` and `<assert.h>`.

(`import_status_handler`): Change return type to `GpgmeError`. Don't check `ctx->error`.

\* `keylist.c` (`keylist_colon_handler`, `keylist_status_handler`, `finish_key`): Change return type to `GpgmeError`, return error directly.

\* `Makefile` (`libgpgme_la_SOURCES`): Add `wait-global.c`, `wait-private.c` and `wait-user.c`

\* `ops.h` (`test_and_allocate_result`): Return error instead setting `ctx->error`.

(\_gpgme\_data\_inbound\_handler, \_gpgme\_data\_outbound\_handler, \_gpgme\_verify\_status\_handler, \_gpgme\_decrypt\_status\_handler, \_gpgme\_sign\_status\_handler, \_gpgme\_encrypt\_status\_handler, \_gpgme\_passphrase\_status\_handler, \_gpgme\_progress\_status\_handler): Change return type to GpgmeError.

(\_gpgme\_passphrase\_command\_handler): Change return type to GpgmeError and add new argument RESULT.

\* op-support.c: Use new callback functions, and change private data to ctx everywhere.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Change return type to GpgmeError, return error directly.

(\_gpgme\_passphrase\_command\_handler): Change return type to GpgmeError, add result argument. Return results accordingly.

\* progress.c (\_gpgme\_progress\_status\_handler): Change return type to GpgmeError, return errors directly.

\* runpg.c (status\_handler): Change return type to GpgmeError. Return error directly.

(close\_notify\_handler): Don't send done event.

(colon\_line\_handler): Change return type to GpgmeError, return errors directly.

\* runpg.c (start): Send start event.

\* sign.c (\_gpgme\_sign\_status\_handler): Change return type to GpgmeError, return errors directly.

\* trustlist.c (trustlist\_status\_handler): Change return type to GpgmeError. Return 0.

(trustlist\_colon\_handler): Change return type to GpgmeError. Return errors directly.

\* verify.c (add\_notation): Change return type to GpgmeError, return errors directly.

(\_gpgme\_verify\_status\_handler): Likewise.

\* wait.h (struct fd\_table): Remove lock member.

(struct wait\_item\_s): Moved here from wait.c.

(struct tag): New structure.

(\_gpgme\_wait\_event\_cb): Remove prototype.

(\_gpgme\_wait\_private\_event\_cb, \_gpgme\_wait\_global\_event\_cb, \_gpgme\_wait\_user\_add\_io\_cb, \_gpgme\_wait\_user\_remove\_io\_cb, \_gpgme\_wait\_user\_event\_io\_cb): New prototypes.

\* wait.c: Don't include <stdio.h>.

(ftd\_global, ctx\_done\_list, ctx\_done\_list\_size, ctx\_done\_list\_length, ctx\_done\_list\_lock, idle\_function): Remove global variable.

(gpgme\_register\_idle, do\_select, \_gpgme\_wait\_event\_cb): Remove function.

(gpgme\_wait): Move to file wait-global.c.

(\_gpgme\_add\_io\_cb): Take ctx as private argument, initialize ctx member in wait item and tag.

(\_gpgme\_remove\_io\_cb): Take ctx from tag. Don't use FDT lock.

(\_gpgme\_wait\_one, \_gpgme\_wait\_on\_condition): Move to

wait-private.c.

(gpgme\_fd\_table\_init): Don't initialize FDT->lock.

(gpgme\_fd\_table\_deinit): Don't destroy FDT->lock.

(\_gpgme\_fd\_table\_put): Make static and rename to ...

(fd\_table\_put): ... this function. Don't use FDT->lock.

(struct wait\_item\_s): Move to wait.h.

\* wait-global.c: New file.

\* wait-private.c: New file.

\* wait-user.c: New file.

\* key.c (gpgme\_key\_sig\_get\_string\_attr): Use validity\_to\_string instead of trust\_to\_string to calculate validity.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* types.h (EngineObject): Move typedef to ...

\* engine.h: ... here.

\* types.h (GpgObject): Move typedef to ...

\* runpgg.c: ... here.

\* types.h (GpgsmObject): Move typedef to ...

\* engine-gpgsm.c: ... here.

\* util.h (return\_if\_fail, return\_null\_if\_fail, return\_val\_if\_fail): Remove macro.

\* gpgme.c (gpgme\_cancel): Don't use return\_if\_fail.

\* key.c (gpgme\_key\_ref): Likewise.

\* signers.c (gpgme\_signers\_enum): Likewise.

(gpgme\_signers\_clear): Likewise.

\* engine-backend.h (struct engine\_ops): Rename get\_path to get\_file\_name.

\* gpgme.h (struct \_gpgme\_engine\_info): Rename member path to file\_name.

\* version.c: Do not include <stdio.h>, <stdlib.h>, context.h and util.h. Other clean ups.

(parse\_version\_number): Protect more seriously against overflow.

(gpgme\_get\_engine\_info): Move to ...

\* engine.c (gpgme\_get\_engine\_info): ... here.

(\_gpgme\_engine\_get\_info): Function removed.

(\_gpgme\_engine\_get\_path): Make static and rename to ...

(engine\_get\_file\_name): .. this.

(\_gpgme\_engine\_get\_version): Make static and rename to ...

(engine\_get\_version): ... this.

(\_gpgme\_engine\_get\_req\_version): Make static and rename to ...

(engine\_get\_req\_version): ... this.

\* engine.h (\_gpgme\_engine\_get\_path, \_gpgme\_engine\_get\_version, \_gpgme\_engine\_req\_version, \_gpgme\_engine\_get\_info.): Remove

prototypes.

- \* gpgme.h (enum GpgmeProtocol): Remove GPGME\_PROTOCOL\_AUTO.
- \* gpgme.c (gpgme\_set\_protocol): Don't handle GPGME\_PROTOCOL\_AUTO.
- (gpgme\_get\_protocol\_name): New function.

- \* engine-backend.h (struct engine\_ops): New member get\_req\_version, remove member check\_version.
- \* engine.h (\_gpgme\_Engine\_get\_version): New prototype.
- \* runpg.c (gpg\_get\_req\_version): New function.
- (gpg\_check\_version): Function removed.
- (\_gpgme\_engine\_ops\_gpg): Add gpg\_get\_req\_version, remove gpg\_check\_version.
- \* engine-gpgsm.c (gpgsm\_get\_req\_version): New function.
- (gpgsm\_check\_version): Function removed.
- (\_gpgme\_engine\_ops\_gpgsm): Add gpgsm\_get\_req\_version, remove gpgsm\_check\_version.
- \* engine.c: Include ops.h.
- (\_gpgme\_engine\_get\_req\_version): New function.
- (gpgme\_engine\_check\_version): Rewritten.
- \* version.c (gpgme\_get\_engine\_info): Rewritten.
- \* gpgme.h (gpgme\_engine\_info): New structure.
- (GpgmeEngineInfo): New type.

2003-01-06 Werner Koch <wk@gnupg.org>

- \* keylist.c (set\_mainkey\_capability): Handle 'd' and 'D' used since gpg 1.3 to denote disabled keys.

2003-01-06 Marcus Brinkmann <marcus@g10code.de>

- \* data-mem.c: Include <string.h>.
- \* engine.c: Likewise.

2003-01-06 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (libgpgme\_la\_DEPENDENCIES): Correct bug in last change.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (gpgme\_op\_verify, gpgme\_op\_decrypt\_verify): Drop R\_STAT argument.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Drop R\_STAT argument.
- \* verify.c (gpgme\_op\_verify): Drop R\_STAT argument.
- (\_gpgme\_intersect\_stati): Function removed.
- \* ops.h (\_gpgme\_intersect\_stati): Remove prototype.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

- \* libpggme.vers: New file.
- \* Makefile.am (EXTRA\_DIST): Add libpggme.vers.
- (libpggme\_version\_script\_cmd): New variable.
- (libpggme\_la\_LDFLAGS): Add libpggme\_version\_script\_cmd here.
- (libpggme\_la\_DEPENDENCIES): New variable.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

- \* key.c (gpgme\_key\_get\_string\_attr): Don't accept GPGME\_ATTR\_IS\_SECRET.
- (otrust\_to\_string): New function.
- (gpgme\_key\_get\_as\_xml): Use it.
- (validity\_to\_string): New function.
- (gpgme\_key\_get\_string\_attr): Beautify using above functions.
- (gpgme\_key\_get\_ulong\_attr): Likewise.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

- \* data-mem.c (mem\_release): Fix gcc warning.
- \* data-user.c (user\_release): Likewise.

2002-12-06 Marcus Brinkmann <marcus@g10code.de>

- \* data.h (gpgme\_data\_release\_cb): Change return type to void.
- (gpgme\_data\_read\_cb): Change return type to ssize\_t.
- \* data.c (gpgme\_data\_read): Likewise.
- \* data-stream.c (stream\_read): Likewise.
- \* data-fd.c (fd\_read): Likewise.
- \* data-mem.c (mem\_read): Likewise.
- (mem\_release): Change return type to void.
- \* data-user.c (user\_read): Change return type to ssize\_t.
- (user\_release): Change return type to void.
- \* data-compatible.c (old\_user\_read): Change return type to ssize\_t.
- \* gpgme.h (GpgmeDataReadCb): Likewise.
- (gpgme\_data\_read): Likewise.
- (GpgmeDataSeekCb): Change return type to off\_t.

2002-12-04 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add prototype for gpgme\_get\_key.
- \* key.c (gpgme\_get\_key): New function.
- \* verify.c (gpgme\_get\_sig\_key): Rewrite using gpgme\_get\_key.
  
- \* gpgme.h: Add prototypes for new interfaces
- gpgme\_key\_sig\_get\_string\_attr and gpgme\_key\_get\_ulong\_attr.
- (enum GpgmeAttr): New attribute GPGME\_ATTR\_SIG\_CLASS.
- \* gpgme.c (gpgme\_set\_keylist\_mode): Allow GPGME\_KEYLIST\_MODE\_SIGS.

\* key.h (struct certsig\_s): New members ALGO, NAME\_PART, EMAIL\_PART, COMMENT\_PART, NAME, SIG\_STAT and SIG\_CLASS.

\* conversion.c (\_gpgme\_decode\_c\_string): Add new parameter LEN.

Use that to determine if allocation is desired or not.

\* util.h: Adjust prototype of \_gpgme\_decode\_c\_string.

\* keylist.c (keylist\_colon\_handler): Adjust caller of \_gpgme\_decode\_c\_string.

\* key.h (struct gpgme\_key\_s): New member last\_uid.

\* key.c (\_gpgme\_key\_append\_name): Rewritten using \_gpgme\_decode\_c\_string and the last\_uid pointer.

(my\_isdigit): Macro removed.

(ALLOC\_CHUNK): Likewise.

\* keylist.c (set\_userid\_flags): Use last\_uid member of KEY.

\* context.h (struct user\_id\_s): New member last\_certsig.

\* key.h: Add prototype for \_gpgme\_key\_add\_certsig.

\* key.c (\_gpgme\_key\_add\_certsig): New function.

(set\_user\_id\_part): Move function before \_gpgme\_key\_add\_certsig.

(parse\_user\_id): Change first argument to SRC, add new arguments

NAME, EMAIL and COMMENT. Change code to use these arguments

instead going through UID. Move function before

\_gpgme\_add\_certsig.

(parse\_x509\_user\_id): Likewise.

(\_gpgme\_key\_append\_name): Adjust arguments to parse\_x509\_user\_id and parse\_user\_id invocation.

(one\_certsig\_as\_xml): New function.

(one\_uid\_as\_xml): Print signatures.

\* context.h (struct gpgme\_context\_s): New member TMP\_UID.

\* keylist.c (keylist\_colon\_handler): Rewritten, implement "sig" record entries.

\* key.c (get\_certsig): New function.

(gpgme\_key\_sig\_get\_string\_attr): Likewise.

(gpgme\_key\_sig\_get\_ulong\_attr): Likewise.

\* keylist.c: Include <ctype.h>.

(my\_isdigit): Macro removed.

(set\_mainkey\_trust\_info): Use isdigit, not my\_isdigit.

(set\_userid\_flags): Likewise.

(set\_subkey\_trust\_info): Likewise.

(set\_ownertrust): Likewise.

(finish\_key): Move function up a bit and remove prototype.

\* runpg.c (gpg\_keylist\_ext): Correct precedence of signature listing mode.

(gpg\_keylist\_ext): Implement signature listing mode.

2002-11-25 Marcus Brinkmann <marcus@g10code.de>

- \* `rungpg.c` (`_gpgme_gpg_spawn`): Do not set parent fds to -1.
- \* `posix-io.c` (`_gpgme_io_spawn`): Call `_gpgme_io_close` instead close for parent fds.
- \* `w32-io.c` (`_gpgme_io_spawn`): Call `_gpgme_io_close` instead `CloseHandle` for parent fds.

2002-11-22 Marcus Brinkmann <marcus@g10code.de>

- \* `gpgme.h` [`_MSC_VER`]: Define `ssize_t` as long.

2002-11-22 Werner Koch <wk@gnupg.org>

- \* `engine-gpgsm.c` (`_gpgme_gpgsm_new`): Save the result of a first `setlocale` before doing another `setlocale`.

2002-11-21 Marcus Brinkmann <marcus@g10code.de>

- \* `decrypt.c`: Some beautification.
- \* `verify.c` (`_gpgme_verify_status_handler`): Treat `GPGME_STATUS_UNEXPECTED` like `GPGME_STATUS_NODATA`. Reported by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

- \* `genkey.c`: Only include `<config.h>` if [`HAVE_CONFIG_H`].  
(`struct genkey_result_s`): Add new member `FPR`.  
(`_gpgme_release_genkey_result`): Free `RESULT->fpr` if set.  
(`genkey_status_handler`): Extract the fingerprint from the status line.  
(`gpgme_op_genkey`): Add new argument `FPR` and return the fingerprint in it.
- \* `gpgme.h`: Adjust prototype of `gpgme_op_genkey`.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

- \* `rungpg.c` (`gpg_keylist`): Add `--with-fingerprint` to `gpg` invocation twice, to get fingerprints on subkeys. Suggested by Timo Schulz <twoaday@freakmail.de>.
- (`gpg_keylist_ext`): Likewise.

2002-11-05 Marcus Brinkmann <marcus@g10code.de>

- \* `import.c` (`append_xml_impinfo`): Use `_gpgme_data_append_string_for_xml` rather than

\_gpgme\_data\_append\_string for the field content.  
Submitted by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-10-10 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.h, engine-gpgsm.h: File removed.  
\* engine-backend.h: New file.  
\* Makefile.am (gpgsm\_components): New variable, set depending on automake conditional HAVE\_GPGSM.  
(libgpgme\_la\_SOURCES): Add engine-backend.h, remove runpgg.h and engine-gpgsm.h. Replace engine-gpgsm.c with \${gpgsm\_components}.  
(status-table.h): Depend on gpgme.h, not runpgg.h.  
\* conversion.c: Include <stdlib.h>.  
\* engine-gpgsm.c: Do not set ENABLE\_GPGSM here. Include "engine-backend.h" instead "engine-gpgsm.h". Reorder some functions and remove all function prototypes.  
(\_gpgme\_gpgsm\_get\_version): Make static and rename to ...  
(gpgsm\_get\_version): ... this.  
(\_gpgme\_gpgsm\_check\_version): Make static and rename to ...  
(gpgsm\_check\_version): ... this.  
(\_gpgme\_gpgsm\_new): Make static. Change argument type from GpgsmObject \* to void \*\*. Call gpgsm\_release instead \_gpgme\_gpgsm\_release.  
(\_gpgme\_gpgsm\_op\_decrypt): Make static and rename to ...  
(gpgsm\_check\_decrypt): ... this.  
(\_gpgme\_gpgsm\_op\_delete): Make static and rename to ...  
(gpgsm\_check\_delete): ... this.  
(\_gpgme\_gpgsm\_set\_recipients): Make static and rename to ...  
(gpgsm\_check\_set\_recipients): ... this.  
(\_gpgme\_gpgsm\_op\_encrypt): Make static and rename to ...  
(gpgsm\_encrypt): ... this.  
(\_gpgme\_gpgsm\_op\_export): Make static and rename to ...  
(gpgsm\_export): ... this.  
(\_gpgme\_gpgsm\_op\_genkey): Make static and rename to ...  
(gpgsm\_genkey): ... this.  
(\_gpgme\_gpgsm\_op\_import): Make static and rename to ...  
(gpgsm\_import): ... this.  
(\_gpgme\_gpgsm\_op\_keylist): Make static and rename to ...  
(gpgsm\_keylist): ... this.  
(\_gpgme\_gpgsm\_op\_keylist\_ext): Make static and rename to ...  
(gpgsm\_keylist\_ext): ... this.  
(\_gpgme\_gpgsm\_op\_sign): Make static and rename to ...  
(gpgsm\_sign): ... this.  
(\_gpgme\_gpgsm\_op\_trustlist): Make static and rename to ...  
(gpgsm\_trustlist): ... this.  
(\_gpgme\_gpgsm\_op\_verify): Make static and rename to ...  
(gpgsm\_verify): ... this.  
(gpgsm\_status\_handler): Rename to ...

(status\_handler): ... this.

(\_gpgme\_gpgsm\_set\_status\_handler): Make static and rename to ...

(gpgsm\_set\_status\_handler): ... this.

(\_gpgme\_gpgsm\_set\_colon\_line\_handler): Make static and rename to ...

(gpgsm\_set\_colon\_line\_handler): ... this.

(\_gpgme\_gpgsm\_add\_io\_cb): Rename to ...

(add\_io\_cb): ... this.

(\_gpgme\_gpgsm\_start): Make static and rename to ...

(gpgsm\_start): ... this.

(\_gpgme\_gpgsm\_set\_io\_cb): Make static and rename to ...

(gpgsm\_set\_io\_cb): ... this.

(\_gpgme\_gpgsm\_io\_event): Make static and rename to ...

(gpgsm\_io\_event): ... this.

(struct \_gpgme\_engine\_ops\_gpgsm): New variable.

[!ENABLE\_GPGSM]: Removed.

\* engine.c: Do not include <time.h>, <sys/types.h>, <string.h>, <assert.h>, "io.h", "runggpg.h" and "engine-gpgsm.h". Include <stdlib.h> and "engine-backend.h".

(struct engine\_object\_s): Rewritten.

(engine\_ops): New variable.

\* engine.c (\_gpgme\_engine\_get\_path, \_gpgme\_engine\_get\_version, \_gpgme\_engine\_check\_version, \_gpgme\_engine\_new, \_gpgme\_engine\_release, \_gpgme\_engine\_set\_verbosity, \_gpgme\_engine\_set\_status\_handler, \_gpgme\_engine\_set\_command\_handler, \_gpgme\_engine\_set\_colon\_line\_handler, \_gpgme\_engine\_op\_decrypt, \_gpgme\_engine\_op\_delete, \_gpgme\_engine\_op\_edit, \_gpgme\_engine\_op\_encrypt, \_gpgme\_engine\_op\_encrypt\_sign, \_gpgme\_engine\_op\_export, \_gpgme\_engine\_op\_genkey, \_gpgme\_engine\_op\_import, \_gpgme\_engine\_op\_keylist, \_gpgme\_engine\_op\_keylist\_ext, \_gpgme\_engine\_op\_sign, \_gpgme\_engine\_op\_trustlist, \_gpgme\_engine\_op\_verify, \_gpgme\_engine\_start, \_gpgme\_engine\_set\_io\_cbs, \_gpgme\_engine\_io\_event): Reimplement.

\* engine.h: Fix a few comments and a variable name in a prototype.

\* ops.h: Do not include "runggpg.h".

\* passphrase.c: Include config.h only if [HAVE\_CONFIG\_H]. Do not include "runggpg.h".

\* recipient.c: Likewise.

\* signers.c: Likewise.

\* version.c: Likewise.

\* runngpg.c: Likewise. Include "engine-backend.h". Reorder functions and remove prototypes.

(\_gpgme\_gpg\_get\_version): Make static and rename to ...

(gpg\_get\_version): ... this.

(\_gpgme\_gpg\_check\_version): Make static and rename to ...

(gpg\_check\_version): ... this.

(\_gpgme\_gpg\_new): Make static. Change argument type from

GpgObject \* to void \*\*. Call gpg\_release instead  
\_gpgme\_gpg\_release.  
(\_gpgme\_gpg\_op\_decrypt): Make static and rename to ...  
(gpg\_check\_decrypt): ... this.  
(\_gpgme\_gpg\_op\_delete): Make static and rename to ...  
(gpg\_check\_delete): ... this.  
(\_gpgme\_gpg\_set\_recipients): Make static and rename to ...  
(gpg\_check\_set\_recipients): ... this.  
(\_gpgme\_gpg\_op\_encrypt): Make static and rename to ...  
(gpg\_encrypt): ... this.  
(\_gpgme\_gpg\_op\_export): Make static and rename to ...  
(gpg\_export): ... this.  
(\_gpgme\_gpg\_op\_genkey): Make static and rename to ...  
(gpg\_genkey): ... this.  
(\_gpgme\_gpg\_op\_import): Make static and rename to ...  
(gpg\_import): ... this.  
(\_gpgme\_gpg\_op\_keylist): Make static and rename to ...  
(gpg\_keylist): ... this.  
(\_gpgme\_gpg\_op\_keylist\_ext): Make static and rename to ...  
(gpg\_keylist\_ext): ... this.  
(\_gpgme\_gpg\_op\_sign): Make static and rename to ...  
(gpg\_sign): ... this.  
(\_gpgme\_gpg\_op\_trustlist): Make static and rename to ...  
(gpg\_trustlist): ... this.  
(\_gpgme\_gpg\_op\_verify): Make static and rename to ...  
(gpg\_verify): ... this.  
(gpg\_status\_handler): Rename to ...  
(status\_handler): ... this.  
(\_gpgme\_gpg\_set\_status\_handler): Make static and rename to ...  
(gpg\_set\_status\_handler): ... this.  
(\_gpgme\_gpg\_set\_colon\_line\_handler): Make static and rename to ...  
(gpg\_set\_colon\_line\_handler): ... this.  
(gpgme\_gpg\_add\_io\_cb): Rename to ...  
(add\_io\_cb): ... this.  
(\_gpgme\_gpg\_start): Make static and rename to ...  
(gpg\_start): ... this.  
(\_gpgme\_gpg\_set\_io\_cb): Make static and rename to ...  
(gpg\_set\_io\_cb): ... this.  
(\_gpgme\_gpg\_io\_event): Make static and rename to ...  
(gpg\_io\_event): ... this.  
(struct \_gpgme\_engine\_ops\_gpg): New variable.

2002-10-10 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify) [!ENABLE\_GPGSM]: Add missing argument.

2002-10-09 Marcus Brinkmann <marcus@g10code.de>

\* data.h, data-user.c, data-stream.c, data-mem.c, data-fd.c,  
data-compat.c: New file. Really check them in this time, completes  
2002-10-08 change.

\* runpgg.h (GpgStatusHandler): Rename type to GpgmeStatusHandler  
and move to ...

\* types.h (GpgmeStatusHandler): ... here.

\* runpgg.h (GpgColonLineHandler): Rename type to GpgmeColonLineHandler.  
and move to ...

\* types.h (GpgmeColonLineHandler): ... here.

\* runpgg.h (GpgCommandHandler): Rename type to GpgmeCommandHandler.  
and move to ...

\* types.h (GpgmeCommandHandler): ... here.

\* engine.h: Don't include "runpgg.h".

(\_gpgme\_engine\_set\_status\_handler): Change type of  
argument from GpgStatusHandler to GpgmeStatusHandler.

(\_gpgme\_engine\_set\_colon\_line\_handler): Change type of  
argument from GpgColonLineHandler to GpgmeColonLineHandler.

(\_gpgme\_engine\_set\_command\_handler): Change type of  
argument from GpgCommandHandler to GpgmeCommandHandler.

\* engine-gpgsm.h: Don't include "runpgg.h".

(\_gpgme\_gpgsm\_set\_status\_handler): Change type of  
argument from GpgStatusHandler to GpgmeStatusHandler.

(\_gpgme\_gpgsm\_set\_colon\_line\_handler): Change type of  
argument from GpgColonLineHandler to GpgmeColonLineHandler.

\* engine-gpgsm.c: Do not include "runpgg.h".

(struct gpgsm\_object\_s): Change type of  
status.fnc to GpgmeStatusHandler. Change type of colon.fnc to  
GpgmeColonLineHandler.

(gpgsm\_assuan\_simple\_command): Change type of argument from  
GpgStatusHandler to GpgmeStatusHandler.

(\_gpgme\_gpgsm\_set\_status\_handler): Likewise.

(\_gpgme\_gpgsm\_set\_colon\_line\_handler): Change type of argument from  
GpgColonLineHandler to GpgmeColonLineHandler.

\* runpgg.h (\_gpgme\_gpg\_set\_status\_handler): Change type of  
argument from GpgStatusHandler to GpgmeStatusHandler.

(\_gpgme\_gpg\_set\_colon\_line\_handler): Change type of  
argument from GpgColonLineHandler to GpgmeColonLineHandler.

(\_gpgme\_gpg\_set\_command\_handler): Change type of  
argument from GpgCommandHandler to GpgmeCommandHandler.

\* runpgg.c (struct gpg\_object\_s): Change type of status.fnc to  
GpgmeStatusHandler. Change type of colon.fnc to  
GpgmeColonLineHandler. Change type of cmd.fnc to  
GpgmeCommandLineHandler.

(\_gpgme\_gpg\_set\_status\_handler): Change type of argument FNC to  
GpgmeStatusHandler.

(\_gpgme\_gpg\_set\_colon\_line\_handler): Change type of argument FNC

to GpgmeColonLineHandler.

(\_gpgme\_gpg\_set\_command\_handler): Change type of argument FNC to GpgmeCommandHandler.

\* engine.c (\_gpgme\_engine\_set\_status\_handler): Change type of argument FNC to GpgmeStatusHandler.

(\_gpgme\_engine\_set\_colon\_line\_handler): Change type of argument FNC to GpgmeColonLineHandler.

(\_gpgme\_engine\_set\_command\_handler): Change type of argument FNC to GpgmeCommandHandler.

\* runpgg.h (\_gpgme\_gpg\_enable\_pipemode): Remove prototype.

\* runpgg.c (struct gpg\_object\_s): Remove PM.

(pipemode\_cb): Prototype removed.

(add\_pm\_data): Function removed.

(\_gpgme\_gpg\_enable\_pipemode): Likewise.

(pipemode\_copy): Likewise.

(pipemode\_cb): Likewise.

(add\_arg): Don't check for pipemode.

(add\_data): Likewise.

(\_gpgme\_gpg\_set\_status\_handler): Likewise.

(\_gpgme\_gpg\_set\_colon\_line\_handler): Likewise.

(\_gpgme\_gpg\_set\_command\_handler): Likewise.

(\_gpgme\_gpg\_spawn): Likewise.

(\_gpgme\_gpg\_spawn): Don't set PM.active.

(\_gpgme\_gpg\_op\_verify): Remove pipemode case.

\* verify.c (\_gpgme\_op\_verify\_start): Remove pipemode case.

\* runpgg.h (\_gpgme\_gpg\_add\_arg, \_gpgme\_gpg\_add\_data, \_gpgme\_gpg\_add\_pm\_data, \_gpgme\_gpg\_housecleaning, \_gpgme\_gpg\_set\_simple\_line\_handler): Prototype removed.

(\_gpgme\_gpg\_set\_verbosity): New prototype.

\* runpgg.c (\_gpgme\_gpg\_add\_data): Make static and rename to ...

(add\_data): ... this.

(\_gpgme\_gpg\_add\_pm\_data): Call add\_data, not \_gpgme\_gpg\_add\_data.

(\_gpgme\_gpg\_set\_command\_handler): Likewise.

(\_gpgme\_gpg\_op\_decrypt, \_gpgme\_gpg\_op\_edit, \_gpgme\_gpg\_op\_encrypt, \_gpgme\_gpg\_op\_encrypt\_sign, \_gpgme\_gpg\_op\_export, \_gpgme\_gpg\_op\_genkey, \_gpgme\_gpg\_op\_import, \_gpgme\_gpg\_op\_sign, \_gpgme\_gpg\_op\_verify): Likewise.

(\_gpgme\_gpg\_add\_pm\_data): Rename to ...

(add\_pm\_data): ... this.

(\_gpgme\_gpg\_op\_verify): Call add\_pm\_data, not \_gpgme\_gpg\_add\_pm\_data.

(\_gpgme\_gpg\_add\_arg): Make static and rename to ...

(add\_arg): ... this.

(\_gpgme\_gpg\_set\_command\_handler, \_gpgme\_gpg\_new, \_gpgme\_gpg\_op\_decrypt, \_gpgme\_gpg\_op\_delete, \_gpgme\_append\_gpg\_args\_from\_signers, \_gpgme\_gpg\_op\_edit,

`_gpgme_append_gpg_args_from_recipients`, `_gpgme_gpg_op_encrypt`,  
`_gpgme_gpg_op_encrypt_sign`, `_gpgme_gpg_op_export`,  
`_gpgme_gpg_op_genkey`, `_gpgme_gpg_op_import`, `_gpgme_gpg_op_keylist`,  
`_gpgme_gpg_op_keylist_ext`, `_gpgme_gpg_op_trustlist`,  
`_gpgme_gpg_op_sign`, `_gpgme_gpg_op_verify`): Use `add_arg`, not  
`_gpgme_gpg_add_arg`.  
`(_gpgme_gpg_set_verbosity)`: New function.  
`(struct gpg_object_s)`: Remove member `simple` from colon.  
`(_gpgme_gpg_set_colon_line_handler)`: Don't initialize `simple`.  
`(_gpgme_gpg_set_simple_line_handler)`: Removed function.  
`(read_colon_line)`: Don't check the `GPG->colon.simple`.  
\* `engine.c` (`_gpgme_engine_set_verbosity`): Call  
`_gpgme_gpg_set_verbosity` instead `_gpgme_gpg_add_arg`.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

\* `util.h` (`_gpgme_malloc`, `_gpgme_realloc`, `_gpgme_calloc`,  
`_gpgme_strdup`, `_gpgme_free`): Remove prototypes.  
`(xtrymalloc, xtrycalloc, xtryrealloc, xtrystrdup, xfree)`: Remove  
macros.  
\* `util.c`: File removed.  
\* `Makefile.am` (`libgpgme_la_SOURCES`): Remove `util.h`.  
\* `conversion.c` (`_gpgme_decode_c_string`): Use `malloc` instead of  
`xtrymalloc`, `realloc` instead of `xtryrealloc`, `calloc` instead of  
`xtrycalloc`, `free` instead of `xfree`.  
`(_gpgme_data_append_percentstring_for_xml)`: Likewise.  
\* `data.c` (`_gpgme_data_new`, `_gpgme_data_release`): Likewise.  
\* `data-compat.c` (`gpgme_data_new_from_filepart`): Likewise.  
\* `data-mem.c` (`mem_write`, `mem_release`, `gpgme_data_new_from_mem`,  
`_gpgme_data_get_as_string`): Likewise.  
\* `debug.c` (`debug_init`): Likewise.  
\* `decrypt.c` (`_gpgme_release_decrypt_result`): Likewise.  
\* `delete.c` (`_gpgme_release_delete_result`): Likewise.  
\* `edit.c` (`_gpgme_release_edit_result`, `_gpgme_op_edit_start`):  
Likewise.  
\* `encrypt.c` (`_gpgme_release_encrypt_result`): Likewise.  
\* `engine.c` (`_gpgme_engine_get_info`, `_gpgme_engine_new`,  
`_gpgme_engine_release`): Likewise.  
\* `engine-gpgsm.c` (`_gpgme_gpgsm_new`, `_gpgme_gpgsm_release`,  
`_gpgme_gpgsm_op_decrypt`, `_gpgme_gpgsm_op_delete`,  
`gpgsm_set_recipients`, `_gpgme_gpgsm_op_encrypt`,  
`_gpgme_gpgsm_op_export`, `_gpgme_gpgsm_op_genkey`,  
`_gpgme_gpgsm_op_import`, `_gpgme_gpgsm_op_keylist`,  
`_gpgme_gpgsm_op_keylist_ext`, `_gpgme_gpgsm_op_sign`,  
`_gpgme_gpgsm_op_verify`, `gpgsm_status_handler`): Likewise.  
\* `genkey.c` (`_gpgme_release_genkey_result`): Likewise.  
\* `gpgme.c` (`gpgme_new`, `gpgme_release`): Likewise.  
\* `import.c` (`_gpgme_release_import_result`): Likewise.

- \* key.c (\_gpgme\_key\_cache\_init, \_gpgme\_key\_cache\_add, key\_new, add\_subkey, gpgme\_key\_release, \_gpgme\_key\_append\_name): Likewise.
- \* keylist.c (\_gpgme\_release\_keylist\_result, keylist\_colon\_handler, \_gpgme\_op\_keylist\_event\_cb, gpgme\_op\_keylist\_next): Likewise.
- \* ops.h (test\_and\_allocate\_result): Likewise.
- \* passphrase.c (\_gpgme\_release\_passphrase\_result, \_gpgme\_passphrase\_status\_handler, \_gpgme\_passphrase\_command\_handler): Likewise.
- \* progress.c (\_gpgme\_progress\_status\_handler): Likewise.
- \* recipient.c (gpgme\_recipients\_new, gpgme\_recipients\_release, gpgme\_recipients\_add\_name\_with\_validity): Likewise.
- \* runpgp.c (\_gpgme\_gpg\_new, \_gpgme\_gpg\_release, \_gpgme\_gpg\_add\_arg, \_gpgme\_gpg\_add\_data, \_gpgme\_gpg\_set\_colon\_line\_handler, free\_argv, free\_fd\_data\_map, build\_argv, \_gpgme\_gpg\_spawn, read\_status, read\_colon\_line): Likewise.
- \* sign.c (\_gpgme\_release\_sign\_result): Likewise.
- \* signers.c (\_gpgme\_signers\_add): Likewise.
- \* trustlist.c (trust\_item\_new, trustlist\_colon\_handler, \_gpgme\_op\_trustlist\_event\_cb, gpgme\_op\_trustlist\_next, gpgme\_trustitem\_release): Likewise.
- \* verify.c (\_gpgme\_release\_verify\_result, finish\_sig): Likewise.
- \* version.c (gpgme\_get\_engine\_info, \_gpgme\_get\_program\_version): Likewise.
- \* w32-io.c (create\_reader, create\_writer, destroy\_reader, destroy\_writer, build\_commandline, \_gpgme\_io\_spawn): Likewise.
- \* w32-sema.c (critsect\_init, \_gpgme\_sema\_cs\_destroy): Likewise.
- \* w32-util.c (read\_w32\_registry\_string): Likewise.
- \* wait.c (\_gpgme\_fd\_table\_deinit, \_gpgme\_fd\_table\_put, \_gpgme\_wait\_event\_cb, \_gpgme\_add\_io\_cb, \_gpgme\_remove\_io\_cb)
- \* data-compat.c: Include <stdlib.h>.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

New data object component:

- \* gpgme.h (GpgmeDataReadCb, GpgmeDataWriteCb, GpgmeDataSeekCb, GpgmeDataReleaseCb): New types.
- (struct GpgmeDataCbs): New structure.
- (gpgme\_data\_read): Changed prototype to match that of read() closely.
- (gpgme\_data\_write): Similar for write().
- (gpgme\_data\_seek, gpgme\_data\_new\_from\_cbs, gpgme\_data\_new\_from\_fd, gpgme\_data\_new\_from\_stream): New prototypes.
- (gpgme\_data\_get\_type, gpgme\_check\_engine): Prototype removed.
- \* Makefile.am (libgpgme\_la\_SOURCES): Add data.h, data-fd.c, data-stream.c, data-mem.c, data-user.c and data-compat.c.
- \* data.c: Reimplemented from scratch.

- \* (data-compat.c, data-fd.c, data.h, data-mem.c, data-stream.c, data-user.c): New file.
- \* context.h (struct gpgme\_data\_s): Removed.
- \* conversion.c: Include <errno.h> and <sys/types.h>.
- (\_gpgme\_data\_append): New function.
- \* data.c (\_gpgme\_data\_append\_string): Move to ...
- \* conversion.c (\_gpgme\_data\_append\_string): ... here.
- \* data.c (\_gpgme\_data\_append\_for\_xml): Move to ...
- \* conversion.c (\_gpgme\_data\_append\_for\_xml): ... here.
- \* data.c (\_gpgme\_data\_append\_string\_for\_xml): Move to ...
- \* conversion.c (\_gpgme\_data\_append\_string\_for\_xml): ... here.
- \* data.c (\_gpgme\_data\_append\_percentstring\_for\_xml): Move to ...
- \* conversion.c (\_gpgme\_data\_append\_percentstring\_for\_xml): ... here.
  
- \* ops.h (\_gpgme\_data\_get\_mode, \_gpgme\_data\_set\_mode): Prototype removed.
- \* types.h (GpgmeDataMode): Type removed.
  
- \* decrypt.c (\_gpgme\_decrypt\_start): Don't check data type or mode.
- \* edit.c (\_gpgme\_op\_edit\_start): Likewise.
- \* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.
- \* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* export.c (\_gpgme\_op\_export\_start): Likewise.
- \* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.
- \* import.c (\_gpgme\_op\_import\_start): Likewise.
- \* sign.c (\_gpgme\_op\_sign\_start): Likewise.
- \* verify.c (\_gpgme\_op\_verify\_start): Likewise.
  
- \* encrypt.c (gpgme\_op\_encrypt): Remove hack that returns invalid no recipient if no data was returned.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign): Remove hack that returns no recipient if no data was returned.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign): Remove hack that returns no recipient if no data was returned.
  
- \* engine.c (\_gpgme\_engine\_op\_verify): Add new argument to differentiate detached from normal signatures.
- \* engine.h (\_gpgme\_engine\_op\_verify): Likewise for prototype.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify): Likewise. Don't check mode of data argument.
- \* engine-gpgsm.h (\_gpgme\_gpgsm\_op\_verify): Likewise for prototype.
- \* gpgme.h (gpgme\_op\_verify\_start): Likewise for prototype.
- (gpgme\_op\_verify): Likewise for prototype.
- \* runpg.c (\_gpgme\_gpg\_op\_verify): Likewise.
- \* runpg.h (\_gpgme\_gpg\_op\_verify): Likewise for prototype.
- \* verify.c (\_gpgme\_op\_verify\_start): Likewise.
- (gpgme\_op\_verify\_start): Likewise.

(gpgme\_op\_verify): Likewise.

\* `runpg.c` (struct `arg_and_data_s`): New member `INBOUND` to hold direction of data object.

(`_gpgme_gpg_add_data`): Add new argument `INBOUND`. Use it to determine direction of data object.

(`_gpgme_gpg_add_pm_data`, `_gpgme_gpg_set_command_handler`, `_gpgme_gpg_op_decrypt`, `_gpgme_gpg_op_edit`, `_gpgme_gpg_op_encrypt`, `_gpgme_gpg_op_encrypt_sign`, `_gpgme_gpg_op_export`, `_gpgme_gpg_op_genkey`, `_gpgme_gpg_op_import`, `_gpgme_gpg_op_sign`, `_gpgme_gpg_op_verify`): Add new argument to `_gpgme_gpg_add_data` invocation.

(`build_argv`): Use new member `INBOUND` to determine direction of file descriptor. Don't check the data type.

\* `runpg.h` (`_gpgme_gpg_add_data`): Add new argument to prototype.

\* `gpgme.c` (`gpgme_get_op_info`): Don't call `_gpgme_data_get_as_string` if `CTX->op_info` is `NULL`.

\* `version.c` (`gpgme_check_engine`): Function removed.

2002-09-30 Werner Koch <wk@gnupg.org>

\* `keylist.c` (`keylist_colon_handler`): Take care when printing a `NULL` with the `DEBUG`.

\* `engine-gpgsm.c` (struct `gpgsm_object_s`): New member `ANY`.  
(`gpgsm_status_handler`): Run the colon function to indicate EOF.  
(`_gpgme_gpgsm_set_colon_line_handler`): Better reset `ANY` here.

2002-09-28 Marcus Brinkmann <marcus@g10code.de>

\* `conversion.c` (`_gpgme_hextobyte`): Prevent superfluous multiplication with base. Reported by Stphane Corthsy.

\* `keylist.c` (`gpgme_op_keylist_ext_start`): Use private asynchronous operation type in invocation of `_gpgme_op_reset`.

2002-09-20 Werner Koch <wk@gnupg.org>

\* `ath.c`: Include `sys/time.h` if `sys/select.h` is not available.

2002-09-13 Marcus Brinkmann <marcus@g10code.de>

\* `keylist.c` (`keylist_status_handler`): Do not call `finish_key()` here.  
(`gpgme_op_keylist_ext_start`): Set `CTX->tmp_key` to `NULL`.

2002-09-03 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (assuan\_libobjs): Remove @LTLIBOBJS@ as we link them into gpgme unconditionally.  
(libgpgme\_la\_LIBADD): Change @LIBOBJS@ into @LTLIBOBJS@.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (assuan\_libobjs): Use @LTLIBOBJS@ instead @LIBOBJS@.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* debug.c (\_gpgme\_debug\_add): Test \*LINE, not LINE.  
(\_gpgme\_debug\_end): Likewise.  
Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* posix-io.c (\_gpgme\_io\_select): Don't use a non-constant struct initializer.  
\* version.c (\_gpgme\_get\_program\_version): Likewise.  
Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c (\_gpgme\_decode\_c\_string): Set DESTP before modifying DEST.  
  
\* conversion.c (\_gpgme\_decode\_c\_string): Fix off by one error in last change.  
\* runpg.c (\_gpgme\_append\_gpg\_args\_from\_signers): Move before \_gpgme\_op\_edit so its prototype is known early on.  
  
\* conversion.c: New file.  
\* util.h: Add prototypes for \_gpgme\_decode\_c\_string and \_gpgme\_hextobyte.  
\* keylist.c (keylist\_colon\_handler): Call \_gpgme\_decode\_c\_string on issuer name.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add conversion.c  
\* key.c (\_gpgme\_key\_append\_name): Replace calls to hextobyte by calls to \_gpgme\_hextobyte.  
(hash\_key): Likewise.

2002-09-01 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_reset): Set CTX->pending after calling \_gpgme\_engine\_release, as this will reset pending to zero in the event done callback on cancelled operations.

2002-08-30 Marcus Brinkmann <marcus@g10code.de>

\* `rungpg.c` (`_gpgme_gpg_op_edit`): Add args from signers.  
Suggested by Miguel Coca <e970095@zipi.fi.upm.es>.

\* `rungpg.c` (`_gpgme_gpg_op_edit`): Add bogus ctx argument.  
\* `rungpg.h`: Also to prototype.  
\* `engine.c` (`_gpgme_engine_op_edit`): Likewise.  
\* `engine.h`: Likewise.  
\* `edit.c` (`_gpgme_op_edit_start`): Likewise.

2002-08-29 Werner Koch <wk@gnupg.org>

\* `engine-gpgsm.c` (`_gpgme_gpgsm_op_sign`): Implement signer selection.  
\* `vasprintf.c` (`va_copy`): Define macro if not yet defined.

2002-08-29 Marcus Brinkmann <marcus@g10code.de>

\* `passphrase.c` (`_gpgme_passphrase_status_handler`): Reset `CTX->result.passphrase->no_passphrase` if passphrase is given (good or bad). Submitted by Jean DIRAISON <jean.diraison@free.fr>.

2002-08-28 Marcus Brinkmann <marcus@g10code.de>

\* `posix-io.c` (`_gpgme_io_spawn`): Use a double-fork approach.  
Return 0 on success, -1 on error.  
\* `version.c` (`_gpgme_get_program_version`): Don't wait for the child.  
\* `engine.c` (`_gpgme_engine_housecleaning`): Function removed.  
(`do_reaping`): Likewise.  
(`_gpgme_engine_add_child_to_reap_list`): Likewise.  
(`struct reap_s`): Removed.  
(`reap_list`): Likewise.  
(`reap_list_lock`): Likewise.  
\* `engine.h` (`_gpgme_engine_io_event`): Remove prototypes for `_gpgme_engine_housecleaning` and `_gpgme_engine_add_child_to_reap_list`.  
\* `rungpg.c` (`_gpgme_gpg_release`): Don't add child to reap list.  
(`struct gpg_object_s`): Remove PID member.  
(`_gpgme_gpg_new`): Don't initialize `GPG->pid`.  
(`_gpgme_gpg_spawn`): Don't set `GPG->pid`.  
\* `wait.c` (`run_idle`): Removed.  
(`gpgme_wait`): Run `idle_function` directly.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* `encrypt-sign.c` (`encrypt_sign_status_handler`): Remove dead variables `encrypt_info` and `encrypt_info_len`.

\* trustlist.c (gpgme\_op\_trustlist\_start): Set colon line handler.

\* posix-sema.c (sema\_fatal): Remove function.

All these reported by Stphane Corthsy.

2002-08-23 Werner Koch <wk@gnupg.org>

\* gpgme-config.in: Made --prefix work for --libs.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* ath.h: Update list of symbols that get a prefix: Rename the ath\_mutex\_\*\_available symbols to ath\_\*\_available.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* stpcpy.c: New file from gnulib.

\* Makefile.am (assuan\_libobjs): Remove jnlib.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Add prototype for gpgme\_op\_import\_ext.

\* import.c (struct import\_result\_s): New member `nr\_considered'.

Rename `any\_imported' to `nr\_imported'.

(import\_status\_handler): Increment nr\_imported. Set nr\_considered if appropriate.

(gpgme\_op\_import\_ext): New function.

(gpgme\_op\_import): Implement in terms of gpgme\_op\_import\_ext.

2002-08-20 Werner Koch <wk@gnupg.org>

\* gpgme.m4: Replaced with a new and faster version. This does not anymore try to build test programs. If we really need test programs, we should add an option to gpgme-config to do so.

\* vasprintf.c (int\_vasprintf): Hack to handle NULL passed for %s.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (\_gpgme\_set\_op\_info): Append data on subsequent calls.

\* encrypt-sign.c (encrypt\_sign\_status\_handler): Remove op\_info handling.

2002-08-19 Werner Koch <wk@gnupg.org>

\* decrypt.c (is\_token, skip\_token): Duplicated from verify.c

(gpgme\_op\_decrypt): Hack to properly return Decryption\_Failed..

(\_gpgme\_decrypt\_status\_handler): Create an operation info.

2002-08-14 Werner Koch <wk@gnupg.org>

- \* key.h (struct certsig\_s): New. Use it in gpgme\_key\_s.
- \* key.c (gpgme\_key\_release): Release it. We need to add more code of course.
- (\_gpgme\_key\_append\_name): Use memset to initialize the struct.
- \* gpgme.h (GPGME\_KEYLIST\_MODE\_SIGS): New.
- \* runpg.c (\_gpgme\_gpg\_op\_keylist): Include sigs in listing depending non the list mode.
  
- \* key.c (gpgme\_key\_get\_string\_attr): Use GPGME\_ATTR\_TYPE to return information about the key type (PGP or X.509).
- (gpgme\_key\_get\_ulong\_attr): Likewise.
  
- \* keylist.c (keylist\_colon\_handler): Include 1 in the check for valid algorithms so that RSA is usable. Store the issuer name and serial number also for "crs" records. Parse the expire date for subkeys.
- (set\_userid\_flags): Put them onto the last appended key.

2002-07-29 Marcus Brinkmann <marcus@g10code.de>

- \* runpg.c (\_gpgme\_gpg\_op\_edit): Use --with-colons.

2002-07-28 Marcus Brinkmann <marcus@g10code.de>

- \* data.c (gpgme\_data\_read): For GPGME\_DATA\_TYPE\_NONE, return EOF instead an error.

The following changes make it possible to flush an inbound data pipe before invoking a command handler:

- \* posix-io.c (\_gpgme\_io\_select): Accept new argument NONBLOCK to \_gpgme\_io\_select. Set timeout of 0 if this is set.
- \* w32-io.c (\_gpgme\_io\_select): Likewise.
- \* io.h: Add new argument NONBLOCK to \_gpgme\_io\_select prototype.
- \* wait.c (do\_select): Add new argument to \_gpgme\_io\_select invocation.
- \* runpg.h (\_gpgme\_gpg\_set\_command\_handler): Add new argument linked\_data to prototype.
- \* engine.h (\_gpgme\_engine\_set\_command\_handler): Likewise.
- \* engine.c (\_gpgme\_engine\_set\_command\_handler): Likewise.
- \* passphrase.c (\_gpgme\_passphrase\_start): Pass NULL as linked\_data argument to \_gpgme\_engine\_set\_command\_handler.
- \* runpg.c (struct gpg\_object\_s): New members linked\_data and linked\_idx in CMD.
- (\_gpgme\_gpg\_new): Initialize those new members.
- (\_gpgme\_gpg\_set\_command\_handler): Accept new argument linked\_data.

(build\_argv): Handle linked\_data in the same hack as cb\_data.

(read\_status): If linked\_data is in use, flush the pipe before activating the command handler.

\* gpgme.h: Add prototypes for gpgme\_op\_edit\_start and gpgme\_op\_edit.

The next changes export the status codes to the user:

\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Likewise, also prefix all STATUS\_ with GPGME\_.

\* delete.c (delete\_status\_handler): Likewise.

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Likewise.

\* encrypt.c (\_gpgme\_encrypt\_status\_handler): Likewise.

(\_gpgme\_encrypt\_sym\_status\_handler): Likewise.

\* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.

\* engine-gpgsm.c (parse\_status): Likewise.

(gpgsm\_status\_handler): Likewise.

(gpgsm\_set\_recipients): Likewise.

\* export.c (export\_status\_handler): Likewise.

\* genkey.c (genkey\_status\_handler): Likewise.

\* import.c (append\_xml\_impinfo): Likewise.

(import\_status\_handler): Likewise.

\* keylist.c (keylist\_status\_handler): Likewise.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Likewise.

(command\_handler): Likewise.

\* progress.c (\_gpgme\_progress\_status\_handler): Likewise.

\* sign.c (\_gpgme\_sign\_status\_handler): Likewise.

\* trustlist.c (trustlist\_status\_handler): Likewise.

\* verify.c (\_gpgme\_verify\_status\_handler): Likewise.

\* gpgme.h (GpgmeEditCb): New type.

\* runpgg.h (GpgStatusCode): Rename and move to ...

\* gpgme.h (GpgmeStatusCode): ... this and here.

\* Makefile.am (status-table.h): Run mkstatus on gpgme.h, not runpgg.h.

\* mkstatus: Prefix STATUS\_ with GPGME\_.

\* runpgg.h (GpgStatusHandler, GpgCommandHandler): Change type accordingly.

\* ops.h (\_gpgme\_verify\_status\_handler, \_gpgme\_decrypt\_status\_handler, \_gpgme\_sign\_status\_handler, \_gpgme\_encrypt\_status\_handler, \_gpgme\_passphrase\_status\_handler, \_gpgme\_progress\_status\_handler): Likewise.

\* runpgg.c (struct gpg\_object\_s): Likewise for CMD.code.

These changes add an edit operation to GPGME:

\* context.h (struct gpgme\_context\_s): New member RESULT.edit. \*

ops.h: Add prototype for \_gpgme\_release\_edit\_result and \_gpgme\_passphrase\_command\_handler.

\* passphrase.c (command\_handler): Make non-static and rename to ...

(\_gpgme\_passphrase\_command\_handler): ... this.  
(\_gpgme\_passphrase\_start): Use new name for command handler.  
\* types.h: Add EditResult type.  
\* gpgme.c (\_gpgme\_release\_result): Release EDIT result.  
\* edit.c: New file.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add edit.c.  
(libgpgme\_la\_LDADD): Rename to libgpgme\_la\_LIBADD, and include  
assuan\_libobjs.  
(assuan\_libobjs): New variable, set this instead  
libgpgme\_la\_LIBADD.  
\* engine.h (\_gpgme\_engine\_op\_edit): New prototype.  
\* engine.c (\_gpgme\_engine\_op\_edit): New function.  
\* runpgg.h (\_gpgme\_gpg\_op\_edit): New prototype.  
\* runpgg.c (\_gpgme\_gpg\_op\_edit): New function.

2002-07-27 Marcus Brinkmann <marcus@g10code.de>

\* delete.c (delete\_problem): New case ambiguous specification.  
(delete\_status\_handler): Handle new case (poorly).

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_delete): Implement this.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_la\_LDADD): Add @LIBOBJS@ for vasprintf and  
fopencookie.  
\* vasprintf.c: Update to more recent libiberty version.  
\* debug.h: Replace #elseif with #elif.

Submitted by Stphane Corthsy:

\* util.h (vasprintf): Correct prototype.  
\* encrypt-sign.c: Include <stddef.h>.  
(encrypt\_sign\_status\_handler): Change type of ENCRYPT\_INFO\_LEN to  
size\_t.  
\* ath-pthread.c: Include <stdlib.h>, not <malloc.h>.  
\* ath-pth.c: Likewise.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (fdt\_global): Make static. Reported by Stphane  
Corthsy.

\* runpgg.c (\_gpgme\_gpg\_op\_keylist\_ext): Skip empty string  
patterns. Reported by Stphane Corthsy.

\* key.c (gpgme\_key\_get\_as\_xml): Add OTRUST attribute. Requested

by Stphane Corthsy.

(gpgme\_key\_get\_string\_attr): Add GPGME\_ATTR\_SIG\_SUMMARY case to silence gcc warning.

\* runpgg.c (\_gpgme\_gpg\_new): Always set utf8 as charset.

2002-07-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_set\_io\_cbs): Deal with CTX being NULL.

\* gpgme.c (\_gpgme\_op\_event\_cb\_user): New function.

\* op-support.c (\_gpgme\_op\_reset): Support a new mode of operation for private or user event loop. Use new user event callback wrapper.

\* trustlist.c (gpgme\_op\_trustlist\_start): Use this new mode.

\* keylist.c (gpgme\_op\_keylist\_start): Likewise.

\* runpgg.c (\_gpgme\_gpg\_io\_event): New function.

\* runpgg.h (\_gpgme\_gpg\_io\_event): New prototype.

\* engine-gpgsm.c (\_gpgme\_gpg\_io\_event): New function.

\* engine-gpgsm.h (\_gpgme\_gpgsm\_io\_event): New prototype.

\* engine.c (\_gpgme\_engine\_io\_event): New function.

\* engine.h (\_gpgme\_engine\_io\_event): New prototype.

\* keylist.c (finish\_key): Call \_gpgme\_engine\_io\_event, and move the real work for the default IO callback routines to ...

(\_gpgme\_op\_keylist\_event\_cb): ... here. New function.

\* trustlist.c (trustlist\_colon\_handler): Signal GPGME\_EVENT\_NEXT\_TRUSTITEM. Move queue manipulation to ...

(\_gpgme\_op\_trustlist\_event\_cb): ... here. New function.

\* gpgme.c (\_gpgme\_op\_event\_cb): Call \_gpgme\_op\_keylist\_event\_cb and \_gpgme\_op\_trustlist\_event\_cb when appropriate.

\* ops.h (\_gpgme\_op\_keylist\_event\_cb): New prototype.

(\_gpgme\_op\_trustlist\_event\_cb): Likewise.

\* op-support.c (\_gpgme\_op\_reset): Add comment why we don't use the user provided event handler directly.

\* gpgme.h (GpgmeRegisterIOCb): Return GpgmeError value, and TAG in a pointer argument.

\* wait.c (\_gpgme\_add\_io\_cb): Likewise.

\* wait.h (\_gpgme\_add\_io\_cb): Likewise for prototype.

\* runpgg.c (\_gpgme\_gpg\_add\_io\_cb): Call IO\_CBS->add with new argument. Fix up error handling.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_add\_io\_cb): Call IO\_CBS->add with new argument, fix up error handling.

2002-07-03 Werner Koch <wk@gnupg.org>

\* encrypt.c (status\_handler\_finish): New.

(\_gpgme\_encrypt\_status\_handler): Moved some code out to the new

function and call this function also in case we get into the status handler with an error which might happen due to a kludge in engine-gpgsm.c

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_op\_keylist\_ext\_start): Always use our own FD table (eg use synchronous mode).

2002-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Fix documentation of key attribute retrieval functions.

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

\* ops.h (\_gpgme\_wait\_on\_condition): Remove HANG argument from prototype and change return type to GpgmeError.

(\_gpgme\_wait\_one): New prototype.

\* wait.c (gpgme\_wait): Replace with the meat from \_gpgme\_wait\_on\_condition here, and remove the support for conditions.

(\_gpgme\_wait\_on\_condition): Remove HANG argument from prototype and change return type to GpgmeError. Replace with meat from \_gpgme\_wait\_one and add support for conditions.

(\_gpgme\_wait\_one): Just call \_gpgme\_wait\_on\_condition without condition.

\* keylist.c (gpgme\_op\_keylist\_ext\_start): Always use our own FD table (eg use synchronous mode).

(gpgme\_op\_keylist\_next): Remove HANG argument from \_gpgme\_wait\_on\_condition. Check its return value.

\* trustlist.c (gpgme\_op\_trustlist\_start): Always use our own FD table (eg use synchronous mode).

(gpgme\_op\_trustlist\_next): Remove HANG argument from \_gpgme\_wait\_on\_condition. Check its return value.

2002-06-26 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (map\_assuan\_error): Map No\_Data\_Available to EOF.

\* import.c (append\_xml\_impinfo): Kludge to print fingerprint instead of keyid for use with gpgsm.

(import\_status\_handler): Set a flag to know whether any import occurred.

(gpgme\_op\_import): Return -1 if no certificate was imported.

2002-06-25 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_set\_io\_cbs) [ENABLE\_GPGSM]: Fixed

function arguments.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`_gpgme_gpgsm_op_export`): Only export the keys listed in RECP.

\* export.c (`gpgme_op_export`): If no data was returned, return GPGME\_No\_Recipients.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`_gpgme_gpgsm_op_export`): Implement.

2002-06-21 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`gpgsm_assuan_simple_command`): Return ERR.

(`parse_status`): New function.

(`gpgsm_status_handler`): Use `parse_status`.

(`gpgsm_assuan_simple_command`): Accept new arguments STATUS\_FNC and STATUS\_FNC\_VALUE and process status messages.

(`gpgsm_set_recipients`): Pass new arguments to `gpgsm_assuan_simple_command`.

(`gpgsm_set_fd`): Likewise.

(`_gpgme_gpgsm_op_keylist`): Likewise.

(`_gpgme_gpgsm_op_keylist_ext`): Likewise.

(`_gpgme_gpgsm_op_sign`): Likewise.

2002-06-21 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (`_gpgme_remove_io_cb`): Unlock FDT->lock.

2002-06-20 Werner Koch <wk@gnupg.org>

\* runpg.c (`build_argv`): Ignore GPG\_AGENT\_INFO if set but empty.

\* verify.c (`calc_sig_summary`): Set bad policy for wrong key usage.

(`skip_token`): New.

(`_gpgme_verify_status_handler`): Watch out for wrong key usage.

(`gpgme_get_sig_string_attr`): Hack to return info on the key usage. Does now make use of the former RESERVED argument which has been renamed to WHATIDX.

(`gpgme_get_sig_ulong_attr`): Renamed RESERVED to WHATIDX.

2002-06-14 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (`do_select`): Return -1 on error, and 0 if nothing to run.

(`_gpgme_wait_one`): Only set HANG to zero if `do_select` returned an error, or there are no more file descriptors to wait on.

(`_gpgme_wait_on_condition`): Ignore return value from `do_select` for

now.

2002-06-13 Werner Koch <wk@gnupg.org>

\* verify.c (gpgme\_op\_verify): Make sure that we never access an uninitialized result structure.

2002-06-12 Werner Koch <wk@gnupg.org>

\* keylist.c (struct keylist\_result\_s): New.  
(\_gpgme\_release\_keylist\_result): Release it here  
(keylist\_status\_handler): Handle truncated.  
(append\_xml\_keylistinfo): New.  
\* gpgme.c (\_gpgme\_release\_result): and use it here.  
\* types.h: Declare the new type here.  
\* context.h (struct gpgme\_context\_s): Use it here.

2002-06-11 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_release): Close status\_cb.fd.  
(\_gpgme\_gpgsm\_new): Duplicate status file descriptor, so we can use our own close notification mechanism without interfering with assuan.

2002-06-11 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_ATTR\_SIG\_SUMMARY and the GPGME\_SIGSUM constants.  
\* verify.c (calc\_sig\_summary): New.  
(gpgme\_get\_sig\_ulong\_attr): And use it here.

2002-06-10 Werner Koch <wk@gnupg.org>

\* runpg.h: Add new status codes TRUNCATED and ERROR.  
\* verify.c (is\_token, copy\_token): New.  
(\_gpgme\_verify\_status\_handler): Use copy\_token, handle the new ERROR status and store the errorcode used withgpgsm and trust status codes.  
\* gpgme.h: New attribute ERRTOK.  
\* key.c (gpgme\_key\_get\_string\_attr): Add dummy case for it.  
(gpgme\_get\_sig\_string\_attr): Use it here to return the last error.

2002-06-10 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_start): Move the code that sets the close notification for the status fd to ...  
(\_gpgme\_gpgsm\_new): ... here.  
\* wait.h: Include "sema.h". Remove prototypes of

`_gpgme_remove_proc_from_wait_queue` and  
`_gpgme_register_pipe_handler`. Add prototypes of  
`_gpgme_fd_table_init`, `_gpgme_fd_table_deinit`, `_gpgme_fd_table_put`,  
`_gpgme_add_io_cb`, `_gpgme_remove_io_cb`, `_gpgme_wait_event_cb` and  
`_gpgme_wait_one`.

\* `wait.c`: Remove global variables `PROC_QUEUE`, `PROC_QUEUE_LOCK`,  
`FD_TABLE_SIZE`, `FD_TABLE`, `FD_TABLE_LOCK`. New global variables  
`FDT_GLOBAL`, `CTX_DONE_LIST`, `CTX_DONE_LIST_SIZE`,  
`CTX_DONE_LIST_LENGTH` and `CTX_DONE_LIST_LOCK`. Remove struct  
`proc_s`. Replace struct `wait_item_s`.  
`(_gpgme_fd_table_init)`: New function.  
`(_gpgme_fd_table_deinit)`: Likewise.  
`(_gpgme_fd_table_put)`: Likewise.  
`(set_process_done)`: Remove function.  
`(do_select)`: Take argument `FDT`. Use that to decide which fds to  
select on.  
`(_gpgme_remove_proc_from_wait_queue)`: Remove function.  
`(_gpgme_wait_event_cb)`: New function.  
`(_gpgme_wait_one)`: Likewise.  
`(_gpgme_register_pipe_handler)`: Remove function.  
`(_gpgme_add_io_cb)`: New function.  
`(_gpgme_remove_io_cb)`: Likewise.  
`(_gpgme_freeze_fd)`: Remove function.  
`(_gpgme_thaw_fd)`: Remove function.

\* `rungpg.c` (struct `fd_data_map_s`): Add new member `TAG`.  
(struct `gpg_object_s`): Likewise for `STATUS` and `COLON`. Add member  
`IDX` to `CMD`. Add new member `IO_CBS`.  
`(close_notify_handler)`: New variables `POSSIBLY_DONE` and `NOT_DONE`.  
For each I/O callback, check if it should be unregistered. If all  
callbacks have been unregistered, trigger `GPGME_EVENT_DONE`.  
Remove member `RUNNING`.  
`(_gpgme_gpg_new)`: Initialize new members.  
`(_gpgme_gpg_release)`: Check `PID` not `RUNNING`. Don't call  
`_gpgme_remove_proc_from_wait_queue`. Close `GPG->CMD.FD` if set.  
`(build_argv)`: Store away the index instead the file descriptor for  
`CMD`.  
`(_gpgme_gpg_add_io_cb)`: New function.  
`(_gpgme_gpg_spawn)`: Use `_gpgme_gpg_add_io_cb` to register IO  
callbacks.  
`(gpg_status_handler)`: Change return type to `void`, remove `PID`  
argument, close filedescriptor if EOF or error occurs.  
`(read_status)`: Use `_gpgme_gpg_add_io_cb` instead `_gpgme_thaw_fd`.  
Use `IO_CBS->remove` instead `_gpgme_freeze_fd`.  
`(gpg_colon_line_handler)`: Change return type to `void`, remove `PID`  
argument, close filedescriptor if EOF or error occurs.  
`(command_cb)`: Use `IO_CBS->remove` instead `_gpgme_freeze_fd`.  
`(_gpgme_gpg_set_io_cbs)`: New function.

\* `rungpg.h` (`_gpgme_gpg_set_io_cbs`): Prototype for

\_gpgme\_gpg\_set\_io\_cbs.  
 \* gpgme.h (GpgmeIOCb): New type.  
 (GpgmeRegisterIOCb): Likewise.  
 (GpgmeRemoveIOCb): Likewise.  
 (GpgmeEventIO): Likewise.  
 (GpgmeEventIOCb): Likewise.  
 (struct GpgmeIOCbs): New structure to hold I/O callbacks.  
 (gpgme\_set\_op\_io\_cbs): New prototype.  
 (gpgme\_get\_op\_io\_cbs): Likewise.  
 \* ops.h: New prototype for \_gpgme\_op\_event\_cb. Remove prototypes for \_gpgme\_freeze\_fd and \_gpgme\_thaw\_fd. Remove PID argument from \_gpgme\_data\_inbound\_handler and \_gpgme\_data\_outbound\_handler prototype. Add prototype for \_gpgme\_op\_reset.  
 Add synchronous argument to \_gpgme\_decrypt\_start prototype.  
 \* io.h: Beautification.  
 \* gpgme.c: Include "wait.h".  
 (gpgme\_new): Initialize FDT.  
 (gpgme\_set\_io\_cbs): New function.  
 (gpgme\_get\_io\_cbs): Likewise.  
 (\_gpgme\_op\_event\_cb): Likewise.  
 \* data.c (\_gpgme\_data\_inbound\_handler): Change return type to void. Drop PID argument. Close FD on error and EOF.  
 (write\_mem\_data): Don't close FD here ...  
 (write\_cb\_data): ... or here ...  
 (\_gpgme\_data\_outbound\_handler): ... but here. Change return type to void. Drop PID argument.  
 \* context.h: Include "wait.h".  
 (struct gpgme\_context\_s): New members FDT and IO\_CBS.  
 \* op-support.c: New file.  
 \* Makefile.am (libgpgme\_la\_SOURCES): Add op-support.c.  
 \* ops.h: Add prototype for \_gpgme\_op\_reset().  
 \* decrypt.c (\_gpgme\_decrypt\_start): New argument SYNCHRONOUS. Use \_gpgme\_op\_reset.  
 (gpgme\_op\_decrypt\_start): Add synchronous argument.  
 (gpgme\_op\_decrypt): Likewise. Use \_gpgme\_wait\_one instead gpgme\_wait.  
 \* delete.c (gpgme\_op\_delete\_start): Rename to ...  
 (\_gpgme\_op\_delete\_start): ... this. New argument SYNCHRONOUS. Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_delete\_start): Just a wrapper around \_gpgme\_op\_delete\_start now.  
 (gpgme\_op\_delete): Add synchronous argument. Use \_gpgme\_wait\_one instead gpgme\_wait.  
 \* encrypt.c: Include "wait.h".  
 (gpgme\_op\_encrypt\_start): Rename to ...  
 (\_gpgme\_op\_encrypt\_start): ... this. New argument SYNCHRONOUS. Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_encrypt\_start): Just a wrapper around

`_gpgme_op_encrypt_start` now.  
(`gpgme_op_encrypt`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `encrypt_sign.c` (`gpgme_op_encrypt_sign_start`): Rename to ...  
(`_gpgme_op_encrypt_sign_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_encrypt_sign_start`): Just a wrapper around `_gpgme_op_encrypt_sign_start` now.  
(`gpgme_op_encrypt_sign`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `export.c` (`gpgme_op_export_start`): Rename to ...  
(`_gpgme_op_export_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_export_start`): Just a wrapper around `_gpgme_op_export_start` now.  
(`gpgme_op_export`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `genkey.c` (`gpgme_op_genkey_start`): Rename to ...  
(`_gpgme_op_genkey_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_genkey_start`): Just a wrapper around `_gpgme_op_genkey_start` now.  
(`gpgme_op_genkey`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `import.c` (`gpgme_op_import_start`): Rename to ...  
(`_gpgme_op_import_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_import_start`): Just a wrapper around `_gpgme_op_import_start` now.  
(`gpgme_op_import`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `keylist.c` (`gpgme_op_keylist_start`): Use `_gpgme_op_reset`.  
(`gpgme_op_keylist_ext_start`): Likewise.  
\* `sign.c` (`gpgme_op_sign_start`): Rename to ...  
(`_gpgme_op_sign_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_sign_start`): Just a wrapper around `_gpgme_op_sign_start` now.  
(`gpgme_op_sign`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
\* `trustlist.c` (`gpgme_op_trustlist_start`): Use `_gpgme_op_reset`.  
\* `verify.c` (`gpgme_op_verify_start`): Rename to ...  
(`_gpgme_op_verify_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
(`gpgme_op_verify_start`): Just a wrapper around `_gpgme_op_verify_start` now.  
(`gpgme_op_verify`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.

\* engine-gpgsm.c (iocb\_data\_t): New type.  
(struct gpgsm\_object\_s): New member status\_cb. Replace input\_fd and input\_data with input\_cb. Replace output\_fd and output\_data with output\_cb. Replace message\_fd and message\_data with message\_cb. New member io\_cbs.  
(\_gpgme\_gpgsm\_new): Initialize all new members (and drop the old ones).  
(close\_notify\_handler): New variable POSSIBLY\_DONE. For each I/O callback, check if it should be unregistered. If all callbacks have been unregistered, trigger GPGME\_EVENT\_DONE.  
(\_gpgme\_gpgsm\_release): Remove variable PID. Use new variable names to close the file descriptors.  
(\_gpgme\_gpgsm\_op\_decrypt): Use new variable names,  
(\_gpgme\_gpgsm\_op\_encrypt): Likewise.  
(\_gpgme\_gpgsm\_op\_genkey): Likewise.  
(\_gpgme\_gpgsm\_op\_import): Likewise.  
(\_gpgme\_gpgsm\_op\_keylist): Likewise.  
(\_gpgme\_gpgsm\_op\_keylist\_ext): Likewise.  
(\_gpgme\_gpgsm\_op\_sign): Likewise.  
(\_gpgme\_gpgsm\_op\_verify): Likewise.  
(gpgsm\_status\_handler): Drop argument PID. Change return type to void. Close status pipe before returning because of EOF or error.  
(\_gpgme\_gpgsm\_add\_io\_cb): New function.  
(\_gpgme\_gpgsm\_start): Use \_gpgme\_gpgsm\_add\_io\_cb to register callback function.  
(\_gpgme\_gpgsm\_set\_io\_cbs): New function.  
\* engine-gpgsm.h: New prototype for \_gpgme\_gpgsm\_set\_io\_cbs.  
\* engine.c (\_gpgme\_engine\_set\_io\_cbs): New function.  
\* engine.h: New prototype for \_gpgme\_engine\_set\_io\_cbs.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_la\_SOURCES): Remove mutex.h.

2002-06-03 Marcus Brinkmann <marcus@g10code.de>

\* key.c: Include <ctype.h>.  
(\_gpgme\_key\_append\_name): Skip one more char when processing escaped char. Submitted by Marc Mutz <mutz@kde.org>. Handle hexadecimal encodings. Also reported by Marc. Thanks!

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* ath.h: Enable the \_gpgme\_ prefix. Fix all those prefix macros.  
\* posix-sema.c: Use that prefix here.  
\* posix-io.c: Include "ath.h".  
(\_gpgme\_io\_read): Use \_gpgme\_ath\_read instead read.  
(\_gpgme\_io\_write): Use \_gpgme\_ath\_write instead write.

(\_gpgme\_io\_waitpid): Use \_gpgme\_ath\_waitpid instead waitpid.  
(\_gpgme\_io\_select): Use \_gpgme\_ath\_select instead select.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (ath\_components): New variable.  
(ath\_components\_pthread): Likewise.  
(ath\_components\_pth): Likewise.  
(system\_components): Add ath\_componentes.

\* ath.h: New file.  
\* ath.c: Likewise.  
\* ath-pthread.c: Likewise.  
\* ath-pth.c: Likewise.  
\* posix-sema.c (\_gpgme\_sema\_cs\_enter): Rework to use the ATH interface.  
\* mutex.h: Remove file.

2002-05-30 Werner Koch <wk@gnupg.org>

\* key.c (gpgme\_key\_get\_string\_attr): Return NULL when asking for an issuer with IDX > 0. We don't support altIssuerNames for now.

2002-05-22 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext): Aehmm, added missing variable definition. Oohh - Marcus was faster.

2002-05-22 Marcus Brinkmann <marcus@gnu.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext): Fix last change.

2002-05-21 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist)  
(\_gpgme\_gpgsm\_op\_keylist\_ext): Pass the keylist mode to gpgsm.

2002-05-10 Werner Koch <wk@gnupg.org>

\* key.h (gpgme\_key\_s): Add OTRUST.  
\* keylist.c (set\_ownertrust): New.  
(keylist\_colon\_handler): Get the ownertrust value  
\* key.c (gpgme\_key\_get\_string\_attr,gpgme\_key\_get\_ulong\_attr):  
Return that value.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

\* w32-util.c: New static variable GET\_PATH\_LOCK.

(\_gpgme\_get\_gpg\_path): Remove superfluous NULL initializer.  
Take lock while determining path.  
(\_gpgme\_get\_gpgsm\_path): Likewise.  
\* version.c (do\_subsystem\_inits): Set DONE to 1 after initialization.  
(gpgme\_get\_engine\_info): New variable ENGINE\_INFO\_LOCK. Take lock while determining engine info.  
\* runpg.c (\_gpgme\_gpg\_get\_version): New variable GPG\_VERSION\_LOCK. Take the lock while determining the program version.  
\* posix-io.c: Include "sema.h".  
(\_gpgme\_io\_spawn): New variable FIXED\_SIGNALS\_LOCK. Take the lock while fixing the signals.  
(\_gpgme\_io\_select): Make READFDS and WRITEFDS non-static.  
\* key.c: Include "sema.h". New globals KEY\_CACHE\_LOCK and KEY\_REF\_LOCK.  
(capabilities\_to\_string): Make STRINGS very const.  
(\_gpgme\_key\_cache\_add): Lock the key cache.  
(\_gpgme\_key\_cache\_get): Likewise.  
(gpgme\_key\_ref, gpgme\_key\_release): Lock the key\_ref\_lock.  
\* import.c (append\_xml\_impinfo): Make IMPORTED\_FIELDS and IMPORT\_RES\_FIELDS very const. Make FIELD and FIELD\_NAME a little const.  
\* engine.c (\_gpgme\_engine\_get\_info): New variable ENGINE\_INFO\_LOCK. Take lock while determining engine info.  
\* engine-gpgsm.c: Include "sema.h".  
(\_gpgme\_gpgsm\_get\_version): New variable GPGSM\_VERSION\_LOCK. Take lock while getting program version.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

\* debug.h: New file.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add debug.h.  
\* util.h: Removed all prototypes and declarations related to debugging. Include "debug.h".  
  
\* debug.c (debug\_level): Comment variable and remove superfluous zero initializer.  
(errfp): Likewise.  
(\_gpgme\_debug\_enabled): Function removed.  
(struct debug\_control\_s): Definition removed.  
(\_gpgme\_debug\_level): Function removed.  
(\_gpgme\_debug\_begin): Rewritten to use vasprintf. Accept a printf-style format specification and a variable number of arguments.  
(\_gpgme\_debug\_add): Rewritten using vasprintf. Expect that format starts out with "%s" for simplicity.  
(\_gpgme\_debug\_end): Rewritten using vasprintf. Do not accept a

TEXT argument anymore.

\* posix-io.c (`_gpgme_io_select`): Use new level argument for `DEBUG_BEGIN` instead explicit if construct.

\* debug.c (`debug_init`): Remove superfluous zero initializer, remove volatile flag of `INITIALIZED`. Do not use the double-checked locking algorithm, it is fundamentally flawed and will empty your fridge (on a more serious note, despite the volatile flag it doesn't give you the guarantee you would expect, for example on a DEC Alpha or an SMP machine. The volatile only serializes accesses to the volatile variable, but not to the other variables).

2002-05-03 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (`_gpgme_gpgsm_new`): Redirect any gpgsm error output to `/dev/null`.

\* verify.c (`gpgme_get_sig_key`): Set the protocol of the listctx.

\* gpgme.c (`gpgme_get_protocol`): New.

\* data.c (`gpgme_data_write`): Changed type of `BUFFER` to `void*`. (`gpgme_data_read`): Ditto.

\* verify.c (`_gpgme_verify_status_handler`): Handle `TRUST_*` status lines so that a claim can be made without looking up the key.

(`gpgme_get_sig_string_attr`): New.

(`gpgme_get_sig_ulong_attr`): New.

\* gpgme.h (`GpgmeAttr`): Added `GPGME_ATTR_SIG_STATUS`.

\* runpgg.h: Add new status codes from gpg 1.0.7 and formatted the list to align with the `status.h` file from gnupg.

\* gpgme.h (`GpgmeSigStat`): Add `_GOOD_EXP` and `_GOOD_EXPKEY`.

\* verify.c (`_gpgme_verify_status_handler`, `finish_sig`): Handle these new status codes. Store the expiration time

2002-04-27 Werner Koch <wk@gnupg.org>

\* gpgme.h (`GpgmeData_Encoding`): New.

\* data.c (`gpgme_data_get_encoding`, `gpgme_data_set_encoding`): New.

\* engine-gpgsm.c (`map_input_enc`): New. Use it in all local functions where the `INPUT` command gets send.

2002-04-27 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify): Close the output descriptor only when we don't need it anymore. Close the message descriptor if we don't need it.

2002-04-26 Werner Koch <wk@gnupg.org>

\* Makefile.am (libgpgme\_la\_LIBADD): Use libtool libraries.

2002-04-25 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (\_gpgme\_gpg\_release): Call gpgme\_data\_release on GPG->cmd.cb\_data, not xfree.

2002-04-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Set the display, ttyname, ttytype, lc\_ctype and lc\_messages options in the server.

2002-04-24 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Add new error codes.

2002-04-23 Werner Koch <wk@gnupg.org>

\* key.c (gpgme\_key\_get\_ulong\_attr): Swapped use of can\_encrypt and can\_certify to return the requested values.

2002-04-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_get\_progress\_cb): Allow either return parameter to be NULL.  
(gpgme\_get\_passphrase\_cb): Likewise.

2002-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_get\_passphrase\_cb): New function.  
(gpgme\_get\_progress\_cb): New function.  
\* gpgme.h: Add new prototypes for gpgme\_get\_passphrase\_cb and gpgme\_get\_progress\_cb.

2002-03-28 Werner Koch <wk@gnupg.org>

\* gpgme.h (GpgmeAttr): Add values for issuer and chaining.  
\* key.h (gpgme\_key\_s): Add issuer and chaining elements for X509.  
\* keylist.c (keylist\_colon\_handler): Store them.  
\* key.c (gpgme\_key\_release): Free them.  
(gpgme\_key\_get\_as\_xml,gpgme\_key\_get\_string\_attr): Print them.

2002-03-26 Werner Koch <wk@gnupg.org>

\* Makefile.am (libpggme\_la\_SOURCES): Add mutex.h

2002-03-21 Werner Koch <wk@gnupg.org>

\* util.h [!HAVE\_FOPENCOOKIE]: Make sure off\_t and ssize\_t are defined.

2002-03-18 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (system\_components): New variable, set depending on HAVE\_DOSISH\_SYSTEM.  
(libpggme\_la\_SOURCES): Use system\_components. Remove `syshdr.h'.  
\* syshdr.h: File removed.

\* posix-io.c: Remove !HAVE\_DOSISH\_SYSTEM safeguard. Clean up source.  
\* posix-sema.c: Likewise.  
\* posix-util.c: Likewise.

\* w32-io.c: Remove HAVE\_DOSISH\_SYSTEM safeguard.  
\* w32-sema.c: Likewise.  
\* w32-util.c: Likewise.

\* posix-io.c: Include `unistd.h', do not include `syshdr.h'.  
\* posix-sema.c: Likewise.  
\* w32-io.c: Include `io.h', do not include `syshdr.h'  
\* w32-sema.c: Likewise.  
\* w32-util.c: Likewise.  
\* data.c: Do not include `syshdr.h'.  
\* wait.c: Likewise.  
\* wait.h: Code cleanup.

\* mutex.h: New file.  
\* posix-sema.c: Implement.

2002-03-08 Werner Koch <wk@gnupg.org>

\* util.h [!HAVE\_FOPENCOOKIE]: Fixed type. Thanks to Frank Heckenbach.

2002-03-07 Werner Koch <wk@gnupg.org>

\* gpgme.h (gpgme\_op\_keylist\_ext\_start): Add prototype.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* encrypt.c (\_gpgme\_encrypt\_sym\_status\_handler): New function.  
(gpgme\_op\_encrypt\_start): New variable SYMMETRIC, set it if RECP

is null, and if it is set, use `_gpgme_encrypt_sym_status_handler` as status handler and run `_gpgme_passphrase_start`.

- \* `rungpg.c (_gpgme_gpg_op_encrypt)`: If RECP is zero, do symmetric encryption.
- \* `engine-gpgsm.c (_gpgme_gpgsm_op_encrypt)`: If RECP is zero, return error value.

\* `rungpg.c (_gpgme_gpg_op_verify)`: Add "--" argument.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

- \* `passphrase.c (_gpgme_passphrase_status_handler)`: Also set the error `No_Passphrase` if only a bad passphrase was provided.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

- \* `rungpg.c (_gpgme_gpg_op_verify)`: If TEXT is of mode `GPGME_DATA_MODE_IN`, construct a command line that stores the plaintext in TEXT.
- \* `verify.c (gpgme_op_verify_start)`: Accept TEXT being uninitialized, and in this case interpret SIG as a normal or cleartext signature and TEXT as a return data object.
- \* `engine-gpgsm.c (_gpgme_gpgsm_op_verify)`: Likewise.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

- \* `engine-gpgsm.c (_gpgme_gpgsm_op_keylist_ext) [!ENABLE_GPGSM]`: Add stub function.

2002-02-28 Werner Koch <wk@gnupg.org>

- \* `key.h (subkey_s)`: New member expires\_at.
- \* `keylist.c (keylist_colon_handler)`: Set it here
- \* `key.c (gpgme_key_get_as_xml, gpgme_key_get_ulong_attr)`: Return it.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

- \* `rungpg.h (_gpgme_gpg_op_keylist_ext)`: New prototype.
- \* `rungpg.c (_gpgme_gpg_op_keylist_ext)`: New function.
- \* `engine-gpgsm.h (_gpgme_gpgsm_op_keylist_ext)`: New prototype.
- \* `engine-gpgsm.c (_gpgme_gpgsm_op_keylist_ext)`: New function.
- \* `engine.h (_gpgme_engine_op_keylist_ext)`: New prototype.
- \* `engine.c (_gpgme_engine_op_keylist_ext)`: New function.
- \* `keylist.c (gpgme_op_keylist_ext_start)`: New function.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

- \* `gpgme.h`: Add new error code `GPGME_Invalid_Recipient`.

\* encrypt.c (struct encrypt\_result\_s): New member invalid\_recipients, rename no\_recipients to no\_valid\_recipients.  
(\_gpgme\_encrypt\_status\_handler): Include error for invalid recipients.  
\* engine-gpgsm.c (gpgsm\_set\_recipients): Change type of first argument to GpgsmObject. Use that to report back the status about the recipients.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_verify\_status\_handler): Fix the last change.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_verify\_status\_handler): Parse the args line to see if the problem is due to a missing key, and report that back to the user.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_engine\_op\_encrypt\_sign): New function.  
\* engine.h (\_gpgme\_engine\_op\_encrypt\_sign): New prototype.  
\* runpgg.c (\_gpgme\_append\_gpg\_args\_from\_signers): New function.  
(\_gpgme\_gpg\_op\_sign): Use that new function.  
(\_gpgme\_gpg\_op\_encrypt\_sign): New function.  
\* runpgg.h (\_gpgme\_gpg\_op\_encrypt\_sign): New prototype.  
\* gpgme.h (gpgme\_op\_encrypt\_sign\_start): New prototype.  
(gpgme\_op\_encrypt\_sign): Likewise.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add encrypt-sign.c.  
\* ops.h (\_gpgme\_encrypt\_status\_handler): Add prototype.  
(\_gpgme\_sign\_status\_handler): Add prototype.  
\* sign.c (sign\_status\_handler): Rename to ...  
(\_gpgme\_sign\_status\_handler): ... this and make non-static.  
\* encrypt.c (encrypt\_status\_handler): Rename to ...  
(\_gpgme\_encrypt\_status\_handler): ... this and make non-static.  
\* encrypt.c (gpgme\_op\_encrypt\_start): Use new status handler name.  
\* sign.c (gpgme\_op\_sign\_start): Likewise.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* context.h (struct gpgme\_context\_s): New member include\_certs.  
\* gpgme.h (gpgme\_set\_include\_certs): Add prototype.  
(gpgme\_get\_include\_certs): Likewise.  
\* gpgme.c (gpgme\_set\_include\_certs): New function.  
(gpgme\_get\_include\_certs): Likewise.  
(gpgme\_new): Set include\_certs to 1 (the default).  
\* engine.c (\_gpgme\_engine\_op\_sign): Accept new argument include\_certs, and pass it to \_gpgme\_gpgsm\_op\_sign.

- \* engine.h (\_gpgme\_engine\_op\_sign): Likewise for prototype.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Accept new argument include\_certs and handle it.
- \* engine-gpgsm.h (\_gpgme\_gpgsm\_start): Add new argument include\_certs.
- \* sign.c (gpgme\_op\_sign\_start): Add new argument to \_gpgme\_engine\_op\_sign call.

2002-02-14 Werner Koch <wk@gnupg.org>

- \* keylist.c (gpgme\_op\_keylist\_start): Do not use a verbose listing.

2002-02-13 Werner Koch <wk@gnupg.org>

- \* vasprintf.c, fopencookie.c: Add replacement functions.
- \* util.h: Add prototypes for them.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Return 0 if we reach the end of the function.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

- \* genkey.c (gpgme\_op\_genkey\_start): Fix logic in validity check.
- (gpgme\_op\_genkey\_start): Skip newlines after opening tag.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_start): Remove cruft.

2002-02-08 Marcus Brinkmann <marcus@g10code.de>

- \* genkey.c (gpgme\_op\_genkey\_start): Allow PUBKEY and SECKEY to be set, and pass them down to the crypto engine.
- \* engine-gpgsm.h (\_gpgme\_gpgsm\_start): New arguments PUBKEY and SECKEY.
- \* engine.h: Likewise.
- \* runpgp.h (\_gpgme\_gpg\_spawn): Likewise.
- \* engine.c (\_gpgme\_engine\_op\_genkey): Likewise. Use those arguments.
- \* runpgp.c (\_gpgme\_gpg\_op\_genkey): Likewise. Complain if those arguments are set.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_genkey): Likewise. Implement function.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Beautify comment.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* runpgp.c (\_gpgme\_gpg\_op\_keylist): Remove handling of keylist mode (for now).

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* wait.c (gpgme\_wait): Add new argument STATUS, in which the status of the returned context is returned.
- (\_gpgme\_wait\_on\_condition): Rework the function a bit, to make it aware of cancelled processes, and to allow to use gpgme\_wait with CTX being NULL (as documented in the source).
- (struct proc\_s): New member REPORTED.
- \* gpgme.h: Fix prototype.
- \* verify.c (gpgme\_op\_verify): Fix use of gpgme\_wait.
- \* sign.c (gpgme\_op\_sign): Likewise.
- \* import.c (gpgme\_op\_import): Likewise.
- \* genkey.c (gpgme\_op\_genkey): Likewise.
- \* export.c (gpgme\_op\_export): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt): Likewise.
- \* delete.c (gpgme\_op\_delete): Likewise.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Likewise.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (gpgme\_set\_keylist\_mode): Possibly return an error value.
- (gpgme\_get\_keylist\_mode): New function.
- (gpgme\_new): Set the default for keylist\_mode member of CTX.
  
- \* gpgme.h (gpgme\_set\_keylist\_mode): Fix prototype.
- (gpgme\_get\_keylist\_mode): New prototype.
- (GPGME\_KEYLIST\_MODE\_LOCAL): New macro.
- (GPGME\_KEYLIST\_MODE\_EXTERN): Likewise..

2002-02-02 Marcus Brinkmann <marcus@g10code.de>

This patch has gotten a bit large... mmh. The main thing that happens here is that error values are now not determined in the operation function after gpgme\_wait completed, but in the status handler when EOF is received. It should always be the case that either an error is flagged or EOF is received, so that after a gpgme\_wait you should never have the situation that no error is flagged and EOF is not received. One problem is that the engine status handlers don't have access to the context, a horrible kludge works around this for now. All errors that happen during a pending operation should be caught and reported in ctx->error, including out-of-core and cancellation. This rounds up neatly a couple of loose ends, and makes it possible to pass up any errors in the communication with the backend as well. As a bonus, there will be a function to access gpgme->wait, so that the operations can truly be implemented with their \_start function.

\* engine-gpgsm.c (gpgsm\_status\_handler): Horrible kludge to report error back to the context.

\* runpgg.c (gpg\_status\_handler): Same horrible kludge applied here.

\* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Add error checking.

\* wait.c (\_gpgme\_wait\_on\_condition): If canceled, set CTX->error to a value indication that.

\* verify.c (add\_notation): Set error, not out\_of\_core.  
 (finish\_sig): Likewise.  
 (gpgme\_op\_verify\_start): Don't clear out\_of\_core.  
 (\_gpgme\_verify\_status\_handler): At EOF, clean up the notation data.  
 (gpgme\_op\_verify): And don't do it here.

\* trustlist.c (trustlist\_status\_handler): Check error, not out\_of\_core.  
 (gpgme\_op\_trustlist\_start): Don't clear out\_of\_core.  
 (gpgme\_op\_trustlist\_next): Check error, not out\_of\_core.  
 (gpgme\_op\_trustlist\_end): Likewise.

\* ops.h (test\_and\_allocate\_result): New macro.  
 (\_gpgme\_passphrase\_result): Remove prototype.

\* delete.c (gpgme\_op\_delete): Return error from context.  
 (delete\_status\_handler): Use macro test\_and\_allocate\_result.  
 Perform error checking at EOF.  
 (gpgme\_op\_delete\_start): Release result.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Use macro test\_and\_allocate\_result, and perform error checking here.  
 (\_gpgme\_passphrase\_result): Function removed.

\* sign.c (gpgme\_op\_sign\_start): Do not set out\_of\_core to zero.  
 (gpgme\_op\_sign): Just return the error value from the context.  
 (sign\_status\_handler): Only progress if no error is set yet. If we process an EOF, set the resulting error value (if any).

\* decrypt.c (\_gpgme\_decrypt\_result): Function removed.  
 (create\_result\_struct): Function removed.  
 (\_gpgme\_decrypt\_status\_handler): Use macro test\_and\_allocate\_result, calculate error on EOF, do not progress with errors.  
 (\_gpgme\_decrypt\_start): Do not set out\_of\_core to zero.  
 (gpgme\_op\_decrypt): Just return the error value from the context.

\* encrypt.c (encrypt\_status\_handler): Perform the error checking here.  
 (gpgme\_op\_encrypt\_start): Do not clear out\_of\_core.

\* export.c (export\_status\_handler): Return if error is set in context.  
 (gpgme\_op\_export\_start): Release result.  
 (gpgme\_op\_export): Return error from context.

\* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Return the error in the context.

\* genkey.c (genkey\_status\_handler): Use macro test\_and\_allocate\_result. Perform error checking at EOF.  
(gpgme\_op\_genkey): Just return the error from context.  
\* import.c (gpgme\_op\_import): Return the error from context.  
(import\_status\_handler): Use macro test\_and\_allocate\_result.  
\* keylist.c (gpgme\_op\_keylist\_start): Do not clear out\_of\_core.  
(gpgme\_op\_keylist\_next): Return error of context.  
(keylist\_colon\_handler): Set error instead out\_of\_code.  
(finish\_key): Likewise.

\* context.h: Remove member out\_of\_core, add member error.  
\* gpgme.c (\_gpgme\_release\_result): Clear error flag.

\* engine.h (\_gpgme\_engine\_get\_error): New prototype.  
\* engine.c (\_gpgme\_engine\_get\_error): New function.  
\* engine-gpgsm.c (\_gpgme\_gpgsm\_get\_error): New function.

\* engine-gpgsm.c (map\_assuan\_error): New function.  
(gpgsm\_assuan\_simple\_command): Change return type to GpgmeError, use the new function to map error values.  
(gpgsm\_set\_fd): Change return type to GpgmeError.  
(\_gpgme\_gpgsm\_op\_decrypt): Change type of ERR to GpgmeError.  
(gpgsm\_set\_recipients): Likewise. Change type of return value equivalently. Adjust error values.  
(\_gpgme\_gpgsm\_op\_import): Likewise.  
(\_gpgme\_gpgsm\_op\_sign): Likewise.  
(struct gpgsm\_object\_s): New member error.  
(gpgsm\_status\_handler): Set error if error occurs. Determine error number from ERR line received. If assuan\_read\_line fails, terminate the connection.

2002-02-01 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (MOSTLYCLEANFILES): New variable.

2002-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): At error, terminate the connection to the server.

2002-01-31 Marcus Brinkmann <marcus@g10code.de>

\* runpg.h: Add STATUS\_KEY\_CREATED.

\* progress.c: New file.

\* Makefile.am (libgpgme\_la\_SOURCES): Add progress.c.

\* genkey.c (genkey\_status\_handler): Use

\_gpgme\_progress\_status\_handler. Add check for status.  
(struct genkey\_result\_s): New structure.  
(\_gpgme\_release\_genkey\_result): New function.  
(gpgme\_op\_genkey): Check for error.  
\* gpgme.c (\_gpgme\_release\_result): Call  
\_gpgme\_release\_genkey\_result.  
\* ops.h (\_gpgme\_release\_genkey\_result): Add prototype.  
\* types.h (GenKeyResult): New type.  
\* context.h (gpgme\_context\_s): Add GenKeyResult to member result.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (\_gpgme\_release\_result): Call  
\_gpgme\_release\_delete\_result.  
\* ops.h (\_gpgme\_release\_delete\_result): Add prototype.  
\* types.h (DeleteResult): New type.  
\* context.h (gpgme\_context\_s): Add DeleteResult to member result.

\* delete.c (enum delete\_problem): New type.  
(struct delete\_result\_s): New structure.  
(\_gpgme\_release\_delete\_result): New function.  
(delete\_status\_handler): Implement more status codes.  
(gpgme\_op\_delete): Return error on failure.

\* import.c (MAX\_IMPORTED\_FIELDS): Bump up to 14.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* import.c (struct import\_result\_s): New structure.  
(\_gpgme\_release\_import\_result): New function.  
(append\_xml\_impinfo): Likewise.  
(import\_status\_handler): Implement.  
\* gpgme.c (\_gpgme\_release\_result): Add call to  
\_gpgme\_release\_import\_result.  
\* ops.h (\_gpgme\_release\_import\_result): Add prototype.  
\* types.h (ImportResult): New type.  
\* context.h (gpgme\_context\_s): Add ImportResult to member result.

\* encrypt.c (gpgme\_op\_encrypt): Code clean up.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Add lots of comment and fix the formatting. Add  
gpgme\_trustlist\_end prototype.

2002-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Add new type GpgmeIdleFunc. Change type of

gpgme\_register\_idle to return and accept this type.

\* wait.c (gpgme\_register\_idle): Fix type.

Save and return old value of idle\_function.

2002-01-29 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Implement secret only mode.

\* keylist.c (keylist\_colon\_handler): Add support for the new "crs" record type.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_release): Call assuan\_disconnect, not assuan\_pipe\_disconnect.

\* Makefile.am (libgpgme\_la\_LIBADD): Change to link assuan and jnlib (needed by assuan) statically into libgpgme. Linking a static library into a shared library this way is not portable.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GpgmePassphraseCb): Change type of R\_HD from void\* to void\*\*.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* data.c (gpgme\_data\_new\_from\_filepart): Change type of LENGTH from off\_t to size\_t.

\* gpgme.h: Likewise.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (\_gpgme\_wait\_on\_condition): If the process finished, reset the pending flag. Also if the operation was cancelled.

(struct proc\_s): Rename READY to DONE.

(wait\_item\_s): Likewise.

(set\_process\_ready): Rename to ...

(set\_process\_done): ... this.

(\_gpgme\_remove\_proc\_from\_wait\_queue): Call set\_process\_done instead set\_process\_ready.

(\_gpgme\_wait\_on\_condition): Likewise.

(do\_select): Rename READY to DONE.

\* verify.c (gpgme\_op\_verify): Do not set pending to zero here.

\* sign.c (gpgme\_op\_sign): Likewise.

\* import.c (gpgme\_op\_import): Likewise.

- \* genkey.c (gpgme\_op\_genkey): Likewise.
- \* export.c (gpgme\_op\_export): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt): Likewise.
- \* delete.c (gpgme\_op\_delete): Likewise.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Likewise.
- \* decrypt.c (gpgme\_op\_decrypt): Likewise.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

- \* export.c: Cleanup.

2002-01-15 Marcus Brinkmann <marcus@g10code.de>

- \* trustlist.c: Various source clean ups.
- (my\_isdigit): Removed.
- (gpgme\_op\_trustlist\_end): New function.

2002-01-13 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c: Various source clean ups, like renaming C to CTX where appropriate.
- (gpgme\_new): Clear R\_CTX before starting the work.
- (my\_isdigit): Removed.
- (my\_isxdigit): Likewise.

- \* data.c: Various source clean ups.
- (gpgme\_data\_new\_from\_mem): Check BUFFER after clearing R\_DH.
- (gpgme\_data\_new\_with\_read\_cb): Similar for READ\_CB.
- (gpgme\_data\_new\_from\_file): Loop over fread while EINTR.
- (gpgme\_data\_new\_from\_filepart): Rediddled a bit. Allow LENGTH to be zero. Loop over fread while EINTR.

- (my\_isdigit): Removed.
- (my\_isxdigit): Likewise.

2001-12-21 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Replace General\_Error with Pipe\_Error where appropriate.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

- \* engine.c: Include `string.h'. Reported by Stphane Corthisy.
- \* version.c (get\_engine\_info): Remove prototype.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): New variable CHILD\_FDS.  
Fill it with the servers fds, and pass it to assuan\_pipe\_connect.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_op\_keylist\_end): New function.  
\* gpgme.h (gpgme\_op\_keylist\_end): New prototype.  
  
\* engine.h (gpgme\_engine\_check\_version): Move prototype to ...  
\* gpgme.h (gpgme\_engine\_check\_version): ... here.  
  
\* genkey.c (gpgme\_op\_genkey\_start): Remove unused variable.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* version.c (gpgme\_get\_engine\_info): Reimplemented.  
(gpgme\_check\_engine): Reimplemented.  
(\_gpgme\_compare\_versions): Return NULL if MY\_VERSION is NULL.  
  
\* engine.c: Include `io.h'.  
(gpgme\_engine\_get\_info): New function.  
\* engine.h (gpgme\_engine\_check\_version, \_gpgme\_engine\_get\_info):  
Add prototype.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (struct reap\_s, reap\_list, reap\_list\_lock): Moved to ...  
\* engine.c (struct reap\_s, reap\_list, reap\_list\_lock): ... here.  
Include `time.h', `sys/types.h', `assert.h', and `sema.h'.  
  
\* runpg.c (\_gpgme\_engine\_add\_child\_to\_reap\_list): New function.  
(do\_reaping, \_gpgme\_gpg\_housecleaning): Moved to ...  
\* engine.c (do\_reaping, \_gpgme\_engine\_housecleaning): ... here.  
\* runpg.c (\_gpgme\_gpg\_release): Replace code that is now in its  
own function by call to \_gpgme\_engine\_add\_child\_to\_reap\_list().  
  
\* wait.c: Include `engine.h'.  
(run\_idle): Call \_gpgme\_engine\_housecleaning(), not  
\_gpgme\_gpg\_housecleaning().

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* key.c (\_gpgme\_key\_append\_name): Append, not prepend, the uid.  
Initialize the next field of the uid structure.  
(gpgme\_key\_get\_as\_xml): Do not list last uid first.

2001-12-17 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_set\_colon\_line\_handler): New function [!ENABLE\_GPGSM].

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify): Put TEXT into message\_data, not SIG.

(\_gpgme\_gpgsm\_op\_sign): Use '--detached', not '--detach'.

\* sign.c (sign\_status\_handler): Call \_gpgme\_passphrase\_status\_handler early.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Revert last change.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Freeze the output file handler when ending this operation, otherwise the wait function will sit on it.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (struct gpgsm\_object\_s): New member colon.attic.

(\_gpgme\_gpgsm\_new): Initialize some more members.

(\_gpgme\_gpgsm\_release): Free the colon line handler's attic line.

(gpgsm\_status\_handler): Rework the inline-data processing.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (\_gpgme\_gpg\_spawn): Do not add the fds to the child list that are not dup'ed, for those the close-on-exec flag is set now.

\* version.c (\_gpgme\_get\_program\_version): Remove first entry in CFD, as the close-on-exec flag is now set for this fd.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_encrypt): Do not add 'armor' option to 'ENCRYPT'.

\* engine-gpgsm.c (gpgsm\_set\_recipients): Free LINE when returning successfully.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (close\_notify\_handler): New function.

(\_gpgme\_gpgsm\_new): Manage the file descriptors a

bit differently. Do not set close-on-exec flags.

(\_gpgme\_gpgsm\_op\_decrypt): Do not set message\_fd to -1, this is done by the close handler.

(\_gpgme\_gpgsm\_op\_encrypt): Likewise.

(\_gpgme\_gpgsm\_op\_import): Likewise (also for output\_fd).

(\_gpgme\_gpgsm\_op\_keylist): Likewise (also for input\_fd and output\_fd).

(\_gpgme\_gpgsm\_op\_sign): Likewise.

(\_gpgme\_gpgsm\_op\_verify): Likewise, but for output\_fd.

\* posix-io.c (\_gpgme\_io\_pipe): Set the close-on-exec flag for the non-inherited file descriptor index of the pipe.

2001-12-13 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_set\_colon\_line\_handler): New.

(gpgsm\_status\_handler): Pass datalines to a colon handler

\* engine.c (\_gpgme\_engine\_set\_colon\_line\_handler): Set the colon handler for gpgsm.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Allow NULL for pattern.

(gpgsm\_assuan\_simple\_command): Removed underscore from assuan\_write\_line.

(\_gpgme\_gpgsm\_start): Ditto.

(gpgsm\_assuan\_simple\_command): Replaced internal Assuan read function by the new assuan\_read\_line. Removed the use of the internal header.

(gpgsm\_status\_handler): Ditto. Use the new assuan\_pending\_line.

(\_gpgme\_gpgsm\_start): Use the documented way to get an fd from assuan.

\* keylist.c (keylist\_colon\_handler): Handle "crt" records

\* key.h (gpgme\_key\_s): Add an x509 flag.

\* key.c (parse\_x509\_user\_id): New.

(\_gpgme\_key\_append\_name): Handle x.509 names.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Make it work with current version of assuan.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_set\_fd): Accept one more argument OPT.

(\_gpgme\_gpgsm\_op\_encrypt): Pass armor argument to gpgsm\_set\_fd for output descriptor.

(\_gpgme\_gpgsm\_op\_sign): Likewise.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_op\_keylist\_next): Set pending to 0 if EOF occurs.

2001-11-26 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Fix stupid typo.

2001-11-24 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Don't break if bsearch fails. Deal with assuan read line returning more than one line (for now).

2001-11-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Implement it according to the current protocol definition.

2001-11-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Set CLOEXEC flag for parent ends of the pipe.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Include stdlib.h and string.h. Also include, for now, runpgg.h and status-table.h. (gpgsm\_status\_handler): Implement more of the status handler.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_engine\_op\_decrypt): Implement CMS case. (\_gpgme\_engine\_op\_delete): Likewise. (\_gpgme\_engine\_op\_encrypt): Likewise. (\_gpgme\_engine\_op\_export): Likewise. (\_gpgme\_engine\_op\_genkey): Likewise. (\_gpgme\_engine\_op\_keylist): Likewise. (\_gpgme\_engine\_op\_sign): Likewise. (\_gpgme\_engine\_op\_trustlist): Likewise.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_encrypt): New function. (gpgsm\_assuan\_simple\_command): Likewise. (gpgsm\_set\_recipients): Likewise. (gpgsm\_set\_fd): Reimplement using gpgsm\_assuan\_simple\_command. (\_gpgme\_gpgsm\_op\_delete): New function. (\_gpgme\_gpgsm\_op\_export): Likewise. (\_gpgme\_gpgsm\_op\_genkey): Likewise.

(\_gpgme\_gpgsm\_op\_sign): Likewise.  
(\_gpgme\_gpgsm\_op\_keylist): Likewise.  
(\_gpgme\_gpgsm\_op\_trustlist): Likewise.  
(\_gpgme\_gpgsm\_release): Release command.  
(\_gpgme\_gpgsm\_op\_decrypt): Allocate command.  
(\_gpgme\_gpgsm\_op\_import): Likewise.  
(gpgsm\_status\_handler): Also treat `ERR' strings as EOF.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_set\_protocol): New prototype.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_decrypt): New function.  
(\_gpgme\_gpgsm\_op\_import): Likewise.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Shuffle around header inclusion a bit, to still  
keep them separate.  
(\_gpgme\_set\_status\_handler) [ENABLE\_GPGSM]: New function.

2001-11-22 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c: Include more headers so that NULL and mk\_error  
is defined even with an undefined GPGSM\_PATH.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (gpg\_inbound\_handler, write\_mem\_data, write\_cb\_data,  
gpg\_outbound\_handler): Moved to ...  
\* data.c (\_gpgme\_data\_inbound\_handler, write\_mem\_data,  
write\_cb\_data, \_gpgme\_data\_outbound\_handler): ... here. Make the  
\_gpgme\_\* ones non-static.  
\* data.c: Include io.h.

\* ops.h (\_gpgme\_data\_inbound\_handler): New prototype.  
(\_gpgme\_data\_outbound\_handler): Likewise.  
(\_gpgme\_gpg\_spawn): Use these new functions.

\* engine-gpgsm.h (\_gpgme\_gpgsm\_op\_decrypt, \_gpgme\_gpgsm\_op\_delete,  
\_gpgme\_gpgsm\_op\_encrypt, \_gpgme\_gpgsm\_op\_export,  
\_gpgme\_gpgsm\_op\_genkey, \_gpgme\_gpgsm\_op\_import,  
\_gpgme\_gpgsm\_op\_keylist, \_gpgme\_gpgsm\_op\_sign,  
\_gpgme\_gpgsm\_op\_trustlist, \_gpgme\_gpgsm\_op\_verify,  
\_gpgme\_gpgsm\_start, \_gpgme\_gpgsm\_set\_status\_handler): New prototype.  
Include <runpg.h> for status handler function.

\* engine-gpgsm.c (struct gpgsm\_object\_s): New members input\_fd, input\_data, output\_fd, output\_data, message\_fd, message\_data, command and status.

(\_gpgme\_gpgsm\_new): Open input, output and message pipes before connecting to the client. Close server's ends afterwards.

(\_gpgme\_gpgsm\_release): Close open file descriptors. Remove server process from wait queue.

(\_gpgme\_gpgsm\_op\_verify, \_gpgme\_gpgsm\_start, \_gpgme\_gpgsm\_set\_status\_handler, gpgms\_status\_handler): New function.

\* engine.c (\_gpgme\_engine\_start): Implement for GPGME\_PROTOCOL\_CMS.

(\_gpgme\_engine\_set\_status\_handler): Likewise.

(\_gpgme\_engine\_op\_verify): Likewise.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* context.h: Do not include runpg.h, but engine.h.

(struct gpgme\_context\_s): Replace member gpg with engine.

\* gpgme.c (gpgme\_release): Release engine, not gpg.

\* recipient.c (\_gpgme\_append\_gpg\_args\_from\_recipients): Function moved ...

\* runpg.c (\_gpgme\_append\_gpg\_args\_from\_recipients): ... here.

Make static, change order of arguments, and return an error value.

\* ops.h (\_gpgme\_append\_gpg\_args\_from\_recipients): Removed prototype.

\* runpg.h (\_gpgme\_gpg\_op\_verify): Add prototype.

(\_gpgme\_gpg\_op\_encrypt): Likewise.

(\_gpgme\_gpg\_op\_decrypt): Likewise.

(\_gpgme\_gpg\_op\_delete): Likewise.

(\_gpgme\_gpg\_op\_export): Likewise.

(\_gpgme\_gpg\_op\_genkey): Likewise.

(\_gpgme\_gpg\_op\_import): Likewise.

(\_gpgme\_gpg\_op\_keylist): Likewise.

(\_gpgme\_gpg\_op\_sign): Likewise.

(\_gpgme\_gpg\_op\_trustlist): Likewise.

\* runpg.c (\_gpgme\_gpg\_op\_verify): New function.

(\_gpgme\_gpg\_op\_encrypt): Likewise.

(\_gpgme\_gpg\_op\_decrypt): Likewise.

(\_gpgme\_gpg\_op\_delete): Likewise.

(\_gpgme\_gpg\_op\_export): Likewise.

(\_gpgme\_gpg\_op\_genkey): Likewise.

(\_gpgme\_gpg\_op\_import): Likewise.

(\_gpgme\_gpg\_op\_keylist): Likewise.

(\_gpgme\_gpg\_op\_sign): Likewise.

(\_gpgme\_gpg\_op\_trustlist): Likewise.

\* engine.h (`_gpgme_engine_set_status_handler`): Add prototype.  
(`_gpgme_engine_set_command_handler`): Likewise.  
(`_gpgme_engine_set_colon_line_handler`): Likewise.  
(`_gpgme_engine_op_decrypt`): Likewise.  
(`_gpgme_engine_op_delete`): Likewise.  
(`_gpgme_engine_op_encrypt`): Likewise.  
(`_gpgme_engine_op_export`): Likewise.  
(`_gpgme_engine_op_genkey`): Likewise.  
(`_gpgme_engine_op_import`): Likewise.  
(`_gpgme_engine_op_keylist`): Likewise.  
(`_gpgme_engine_op_sign`): Likewise.  
(`_gpgme_engine_op_trustlist`): Likewise.  
(`_gpgme_engine_op_verify`): Likewise.  
(`_gpgme_engine_start`): Likewise.  
\* engine.c (`_gpgme_engine_set_status_handler`): New function.  
(`_gpgme_engine_set_command_handler`): Likewise.  
(`_gpgme_engine_set_colon_line_handler`): Likewise.  
(`_gpgme_engine_op_decrypt`): Likewise.  
(`_gpgme_engine_op_delete`): Likewise.  
(`_gpgme_engine_op_encrypt`): Likewise.  
(`_gpgme_engine_op_export`): Likewise.  
(`_gpgme_engine_op_genkey`): Likewise.  
(`_gpgme_engine_op_import`): Likewise.  
(`_gpgme_engine_op_keylist`): Likewise.  
(`_gpgme_engine_op_sign`): Likewise.  
(`_gpgme_engine_op_trustlist`): Likewise.  
(`_gpgme_engine_op_verify`): Likewise.  
(`_gpgme_engine_start`): Likewise.  
  
\* verify.c (`gpgme_op_verify_start`): Reimplement in terms of above functions.  
\* encrypt.c (`gpgme_op_encrypt_start`): Likewise.  
\* decrypt.c (`_gpgme_decrypt_start`): Likewise.  
\* passphrase.c (`_gpgme_passphrase_start`): Likewise.  
\* keylist.c (`gpgme_op_keylist_start`): Likewise.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* types.h: Add types EngineObject and GpgsmObject.  
  
\* Makefile.am (`libgpgme_la_SOURCES`): Add engine-gpgsm.h, engine-gpgsm.c, engine.h and engine.c.  
\* engine.h: New file.  
\* engine.c: Likewise.  
\* engine-gpgsm.h: Likewise.  
\* engine-gpgsm.c: Likewise.  
  
\* runpg.c (`_gpgme_gpg_get_version`): New function.

(`_gpgme_gpg_check_version`): Likewise.  
\* `rungpg.h`: Add prototypes for `_gpgme_gpg_get_version` and `_gpgme_gpg_check_version`.

\* `version.c` (`compare_versions`): Rename to ...  
(`_gpgme_compare_versions`): ... this. Make non-static.  
(`gpgme_check_version`): Use `_gpgme_compare_versions` rather than `compare_versions`.  
(`gpgme_check_engine`): Likewise.  
\* `ops.h` (`_gpgme_get_program_version`): Add prototype.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* `Makefile.am` (`libgpgme_la_INCLUDES`): Remove obsolete directive.  
(`AM_CPPFLAGS`): New directive [`BUILD_ASSUAN`].  
(`libgpgme_la_LIBADD`): Likewise.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* `version.c`: Remove global variables `lineno` and `tmp_engine_version`.  
(`version_handler`): Removed.  
(`_gpgme_get_program_version`): New function.  
(`get_engine_info`): Don't use context and `version_handler`, but `_gpgme_get_program_version`.  
\* `ops.h` (`_gpgme_get_program_version`): Add prototype for `_gpgme_get_program_version` (we expect to use it elsewhere soon).

2001-11-18 Marcus Brinkmann <marcus@g10code.de>

\* `version.c` (`get_engine_info`): If GnuPG is not available, return an error message.  
\* `posix-util.c` (`_gpgme_get_gpg_path`): Allow `GPG_PATH` to be undefined.  
(`_gpgme_get_gpgsm_path`): New function.  
\* `w32-util.c` (`find_program_in_registry`): New static function.  
(`_gpgme_get_gpg_path`): Allow `GPG_PATH` to be undefined. Rework to use `find_program_in_registry`.  
(`_gpgme_get_gpgsm_path`): New function.  
(`util.h`): Prototype `_gpgme_get_gpgsm_path`.  
\* `rungpg.c` (`_gpgme_gpg_spawn`): Verify that `_gpgme_get_gpg_path()` returns non-null.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

\* `decrypt-verify.c`: New file.  
\* `Makefile.am` (`libgpgme_la_SOURCES`): Add `decrypt-verify.c`.  
\* `types.h`: Add `decrypt-verify` types.

\* ops.h: Likewise.  
\* context.h: Add result type for decrypt-verify.  
\* gpgme.h: Add decrypt-verify prototypes.

\* decrypt.c (decrypt\_status\_handler): Renamed to ...  
(\_gpgme\_decrypt\_status\_handler): ... this. Make non-static.  
(\_gpgme\_decrypt\_start): New function, derived from  
gpgme\_op\_decrypt\_start.  
(gpgme\_op\_decrypt\_start): Reimplement in terms of  
\_gpgme\_decrypt\_start.  
(\_gpgme\_decrypt\_result): New function to retrieve error value.  
(gpgme\_op\_decrypt): Use \_gpgme\_decrypt\_result.  
\* ops.h: Add prototypes for new functions.

\* verify.c (verify\_status\_handler): Renamed to ...  
(\_gpgme\_verify\_status\_handler): ... this. Make non-static.  
(gpgme\_op\_verify\_start): Use new function name.  
(intersect\_stati): Renamed to ...  
(\_gpgme\_intersect\_stati): ... this. Make non-static.  
(gpgme\_op\_verify): Use new name.  
\* ops.h: Add prototypes for new functions.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

\* passphrase.c: New file.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add passphrase.c.  
\* ops.h (\_gpgme\_passphrase\_result): Add prototypes from  
passphrase.c.  
\* types.h: Likewise.  
\* context.h: Add member passphrase to result.  
\* gpgme.c (\_gpgme\_release\_result): Release passphrase member.

\* decrypt.c: Some formatting and variable name changes (like  
CTX instead C).  
(struct decrypt\_result\_s): Remove members now found in  
passphrase result.  
(\_gpgme\_release\_decrypt\_result): Don't release removed members.  
(decrypt\_status\_handler): Call \_gpgme\_passphrase\_status\_handler,  
and don't handle the cases caught there.  
(command\_handler): Removed.  
(gpgme\_op\_decrypt\_start): Don't set command handler, but invoke  
\_gpgme\_passphrase\_start which does it.  
(gpgme\_op\_decrypt): Invoke \_gpgme\_passphrase\_result and drop the  
cases covered by it.

\* sign.c Some formatting and variable name changes (like  
CTX instead C).  
(struct sign\_result\_s): Remove members now found in

passphrase result.

(\_gpgme\_release\_sign\_result): Don't release removed members.

(sign\_status\_handler): Call \_gpgme\_passphrase\_status\_handler, and don't handle the cases caught there.

(command\_handler): Removed.

(gpgme\_op\_sign\_start): Don't set command handler, but invoke \_gpgme\_passphrase\_start which does it.

(gpgme\_op\_sign): Invoke \_gpgme\_passphrase\_result and drop the cases covered by it.

2001-11-15 Marcus Brinkmann <marcus@g10code.de>

\* decrypt.c (command\_handler): Fix last change.

2001-11-15 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_release\_verify\_result): Rename RES to RESULT.

Rename R2 to NEXT\_RESULT.

(intersect\_stati): Rename RES to RESULT.

(gpgme\_get\_sig\_status): Likewise. Do not check return\_type, but the member verify of result.

(gpgme\_get\_sig\_key): Likewise.

\* sign.c (\_gpgme\_release\_sign\_result): Rename RES to RESULT. If RESULT is zero, return.

(sign\_status\_handler, command\_handler): Do not check return\_type, but the member sign of result.

(gpgme\_op\_sign): Likewise. Drop assertion.

\* encrypt.c (\_gpgme\_release\_encrypt\_result): Rename RES to RESULT.

If RESULT is zero, return.

(encrypt\_status\_handler): Do not check return\_type, but the member encrypt of result.

(gpgme\_op\_encrypt): Likewise. Drop assertion.

\* decrypt.c (\_gpgme\_release\_decrypt\_result): Rename RES to RESULT.

(create\_result\_struct): Do not set result\_type.

(command\_handler, decrypt\_status\_handler): Do not check return\_type, but the member decrypt of result.

(gpgme\_op\_decrypt): Likewise. Drop assertion.

\* context.h (enum ResultType): Removed.

(struct gpgme\_context\_s): Remove member result\_type.

(struct result): Replaces union result.

\* gpgme.c: Include string.h.

(\_gpgme\_release\_result): Release all members of c->result, which is now a struct. Zero out all members of the struct afterwards.

2001-11-11 Marcus Brinkmann <marcus@g10code.de>

\* `runpg.c` (`_gpgme_gpg_release`): Release GPG->cmd.cb\_data.  
Release all members of the list GPG->arglist.  
Reported by Michael Schmidt <mschmidt@cs.uni-sb.de>.

2001-11-02 Marcus Brinkmann <marcus@g10code.de>

\* `runpg.c` (`pipemode_copy`): Change type of NBYTES to `size_t`.  
  
\* `key.c`: Include `string.h`.  
\* `data.c`: Likewise.  
\* `recipient.c`: Likewise.

2001-10-29 Marcus Brinkmann <marcus@g10code.de>

\* `context.h`: New member `signers_len`.  
\* `signers.c` (`gpgme_signers_clear`): Require that signers are non-NULL with assertion. Use `signers_len` to determine how much keys to release. Add documentation.  
(`gpgme_signers_add`): Use `signers_len` to determine if the buffer is large enough. Use `xtryrealloc` rather than `xtrymalloc` and copying. Add documentation.  
(`gpgme_signers_enum`): Use `signers_len` to determine if key is available. Add documentation.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* `data.c` (`_gpgme_data_append`): Check if `LENGTH` is smaller than `ALLOC_CHUNK`, not `DH->length`.

2001-10-17 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.c` (`gpgme_set_protocol`): Fix last change.

2001-10-15 Werner Koch <wk@gnupg.org>

\* `gpgme.h` (`GpgmeProtocol`): New.  
\* `gpgme.c` (`gpgme_set_protocol`): New.

2001-09-26 Werner Koch <wk@gnupg.org>

\* `gpgme.c` (`gpgme_set_passphrase_cb`): Ignore a NULL context.  
(`gpgme_set_progress_cb`): Ditto. Suggested by Mark Mutz.

2001-09-17 Werner Koch <wk@gnupg.org>

\* `keylist.c` (`finish_key`): Shortcut for no `tmp_key`. Changed all

callers to use this function without a check for tmp\_key.

\* keylist.c (gpgme\_op\_keylist\_next): Reset the key\_cond after emptying the queue. Bug reported by Stphane Corthsy.

2001-09-12 Werner Koch <wk@gnupg.org>

\* data.c (gpgme\_data\_rewind): Allow rewind for callbacks.

2001-09-07 Werner Koch <wk@gnupg.org>

\* runpgg.h: Add NO\_RECP.

\* encrypt.c (encrypt\_status\_handler): Take on No\_RECP.  
(gpgme\_op\_encrypt): Better error return.

\* verify.c (verify\_status\_handler): Take on NODATA.

2001-09-03 Werner Koch <wk@gnupg.org>

\* runpgg.h: Added STATUS\_INV\_RECP.

\* gpgme.c (\_gpgme\_release\_result): Add support for new EncryptResult object.

\* encrypt.c (append\_xml\_encinfo): New.  
(encrypt\_status\_handler): Add some status parsing.  
(\_gpgme\_release\_encrypt\_result): New.

2001-08-29 Werner Koch <wk@gnupg.org>

\* recipient.c (gpgme\_recipients\_release): Free the list. By Timo.

\* keylist.c (keylist\_colon\_handler): Do a finish key if we receive an EOF here. This is probably the reason for a lot of bugs related to keylisting. It is so obvious. Kudos to Enno Cramer for pointing that out.

2001-08-28 Werner Koch <wk@gnupg.org>

\* gpgme.c, gpgme.h (gpgme\_get\_op\_info): New.

(\_gpgme\_set\_op\_info): New.

(\_gpgme\_release\_result): Reset the op\_info here.

\* sign.c (append\_xml\_siginfo): New.

(sign\_status\_handler): Store the sig create information.

2001-07-31 Werner Koch <wk@gnupg.org>

\* encrypt.c (gpgme\_op\_encrypt): Hack to detect no valid recipients.

2001-07-30 Werner Koch <wk@gnupg.org>

\* gpgme.c (gpgme\_get\_armor,gpgme\_get\_textmode): New.

\* runpgg.c (build\_argv): Disable armor comments

\* w32-io.c (build\_commandline): Need to add quotes here

2001-07-24 Werner Koch <wk@gnupg.org>

\* data.c (gpgme\_data\_read): Add a way to return the available bytes.

2001-07-23 Werner Koch <wk@gnupg.org>

\* util.c: Removed stpcpy() because we use the version from jnlib.

2001-07-19 Werner Koch <wk@gnupg.org>

\* mkstatus: Define the collating sequence for sort.

2001-06-26 Werner Koch <wk@gnupg.org>

\* runpgg.h: Add STATUS\_UNEXPECTED as suggested by Timo.

2001-06-15 Werner Koch <wk@gnupg.org>

\* keylist.c (set\_userid\_flags): Fixed the assigned values. Kudos to Timo for pointing this out.

2001-06-01 Werner Koch <wk@gnupg.org>

\* debug.c (\_gpgme\_debug\_begin): Fixed a /tmp race. Noted by Johannes Poehlmann.

2001-05-28 Werner Koch <wk@gnupg.org>

\* version.c (gpgme\_check\_engine): Stop version number parsing at the opening angle and not the closing one. By Tommy Reynolds.

2001-05-01 Jos Carlos Garca Sogo <jose@jaimedelamo.eu.org>

\* encrypt.c (gpgme\_op\_encrypt\_start): Deleted the assert ( !c->gpg ) line, because it gave an error if another operation had been made before using the same context.

\* decrypt.c (gpgme\_op\_decrypt\_start): The same as above. Also added one line to release the gpg object in the context (if any).

2001-04-26 Werner Koch <wk@gnupg.org>

- \* key.c, key.h (\_gpgme\_key\_cache\_init): New.
- (\_gpgme\_key\_cache\_add): New.
- (\_gpgme\_key\_cache\_get): New.
- \* version.c (do\_subsystem\_inits): Init the cache.
- \* keylist.c (finish\_key): Put key into the cache
- \* verify.c (gpgme\_get\_sig\_key): First look into the cache.

2001-04-19 Werner Koch <wk@gnupg.org>

- \* keylist.c (parse\_timestamp): Adjusted for the changed --fixed-list-mode of gpg 1.0.4h.

2001-04-05 Werner Koch <wk@gnupg.org>

- \* verify.c (gpgme\_op\_verify\_start): Enabled pipemode for detached sigs.

2001-04-04 Werner Koch <wk@gnupg.org>

- \* w32-io.c (\_gpgme\_io\_select): Don't select on the writer if there are still bytes pending. Timo found this not easy to track down race condition.

2001-04-02 Werner Koch <wk@gnupg.org>

- \* gpgme.h: Add GPGME\_ATTR\_KEY\_{EXPIRED,DISABLED}.
- \* key.c (gpgme\_key\_get\_ulong\_attr): And return those attribs.

- \* verify.c (gpgme\_get\_sig\_key): Set keylisting mode depending on the mode set in the current context. Suggested by Timo.

- \* key.c (gpgme\_key\_get\_ulong\_attr): Return can\_certify and not can\_encrypt. By Timo.

2001-03-30 Werner Koch <wk@gnupg.org>

- \* debug.c (debug\_init): Allow to specify a debug file.
- (\_gpgme\_debug\_level): New.

- \* posix-io.c (\_gpgme\_io\_read, \_gpgme\_io\_write): Print output.
- (\_gpgme\_io\_select): Debug only with level > 2.

2001-03-15 Werner Koch <wk@gnupg.org>

- \* runpgg.c: Included time.h.

- \* key.h: New keyflags for capabilities.
- \* keylist.c (set\_mainkey\_capability, set\_subkey\_capability): New.
- (keylist\_colon\_handler): Parse them.

\* gpgme.h: New attribute values for capabilities.  
\* key.c (gpgme\_key\_get\_string\_attr): Return them.  
(capabilities\_to\_string): New.  
(gpgme\_key\_get\_ulong\_attr): Return the global caps.

2001-03-14 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader,destroy\_writer): Fixed syntax error.  
Thanks to Jan Oliver Wagner.

2001-03-13 Werner Koch <wk@gnupg.org>

\* context.h: Add invalid and revoke flags to user\_id structure.  
\* keylist.c (gpgme\_op\_keylist\_start): Use --fixed-list-mode.  
(keylist\_colon\_handler): Adjust for that.  
(set\_userid\_flags): New.  
(set\_mainkey\_trust\_info): Handle new key invalid flag  
(set\_subkey\_trust\_info): Ditto.  
\* gpgme.h: Add new attributes for key and user ID flags.  
\* key.c (\_gpgme\_key\_append\_name): Init these flags  
(gpgme\_key\_get\_as\_xml): Print them.  
(one\_uid\_as\_xml): New helper for above.  
(gpgme\_key\_get\_string\_attr, gpgme\_key\_get\_ulong\_attr):  
Return the new attributes. Enhanced, so that subkey information  
can be returned now.

2001-02-28 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader): Set stop\_me flag.  
(writer,create\_writer,destroy\_writer,find\_writer,kill\_writer): New.  
(\_gpgme\_io\_write): Use a writer thread to avoid blocking.  
(\_gpgme\_io\_close): Cleanup a writer thread  
(\_gpgme\_io\_select): Replace the faked wait on writing by a real  
waiting which is now possible due to the use of a writer thread.

2001-02-20 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader,kill\_reader): New.  
(create\_reader, reader): Add a new event to stop the thread.  
(\_gpgme\_io\_close): Kill the reader thread.  
  
\* posix-io.c (\_gpgme\_io\_select): Handle frozen fds here.  
\* 32-io.c (\_gpgme\_io\_select): Ditto. Removed a bunch of unused code.  
  
\* wait.c: Reworked the whole thing.  
\* runpg.c (\_gpgme\_gpg\_new): Init pid to -1.  
(\_gpgme\_gpg\_release): Remove the process from the wait queue.

2001-02-19 Werner Koch <wk@gnupg.org>

\* w32-io.c (\_gpgme\_io\_set\_close\_notify): New.  
(\_gpgme\_io\_close): Do the notification.

\* posix-io.c (\_gpgme\_io\_select): Use a 1 sec timeout and not 200 microseconds.

\* wait.c (remove\_process): Don't close the fd here.  
(do\_select): Set the fd to -1 and remove the is\_closed flag everywhere.  
(\_gpgme\_wait\_on\_condition): Remove the assert on the queue and break out if we could not find the queue. The whole thing should be reworked.

\* posix-io.c (\_gpgme\_io\_set\_close\_notify): New.  
(\_gpgme\_io\_close): Do the notification.

\* runpg.c (close\_notify\_handler): New.  
(\_gpgme\_gpg\_new): Register a callback for the fd.  
(\_gpgme\_gpg\_set\_colon\_line\_handler): Ditto.  
(build\_argv): Ditto

2001-02-13 Werner Koch <wk@gnupg.org>

\* runpg.c (struct reap\_s): Replaced pid\_t by int.

\* types.h: Add ulong typedef.

\* runpg.c (do\_reaping, \_gpgme\_gpg\_housecleaning): New.  
(\_gpgme\_gpg\_release): Reap children.

\* io.h, posix-io.c (\_gpgme\_io\_kill): New.

\* w32-io.c (\_gpgme\_io\_kill): New (dummy).

\* keylist.c (gpgme\_op\_keylist\_start): Cancel a pending request.

\* posix-io.c (\_gpgme\_io\_read): Add some debug output.

(\_gpgme\_io\_write): Ditto.

(\_gpgme\_io\_select): Increased the timeout.

2001-02-12 Werner Koch <wk@gnupg.org>

Enhanced the signature verification, so that it can now handle more than one signature and is able to return more information on the signatures.

\* verify.c (gpgme\_get\_sig\_key): New.

(gpgme\_get\_sig\_status): New.

\* gpgme.h: Add stdio.h.

(GpgmeSigStat): New status DIFF.

2001-02-01 Werner Koch <wk@gnupg.org>

\* w32-io.c (set\_synchronize): Add EVENT\_MODIFY\_STATE. Add Debug code to all Set/ResetEvent().

\* runpg.c (read\_status): Check for end of stream only if we have an r. By Timo.

2001-01-31 Werner Koch <wk@gnupg.org>

\* wait.c (\_gpgme\_wait\_on\_condition): Removed all exit code processing.

(propagate\_term\_results,clear\_active\_fds): Removed.

(count\_active\_fds): Renamed to ..

(count\_active\_and\_thawed\_fds): .. this and count only thawed fds.

\* runpg.c (gpg\_colon\_line\_handler): Return colon.eof and not status.eof ;-)

2001-01-30 Werner Koch <wk@gnupg.org>

\* w32-io.c (\_gpgme\_io\_spawn): Use the supplied path arg.

\* version.c (get\_engine\_info): Return better error information.

\* posix-util.c, w32-util.c: New.

(\_gpgme\_get\_gpg\_path): New, suggested by Jan-Oliver.

\* runpg.c (\_gpgme\_gpg\_spawn): Use new function to get GPG's path.

\* signers.c (gpgme\_signers\_add): Oops, one should test code and not just write it; the newarr was not assigned. Thanks to Jos for pointing this out. Hmm, still not tested, why should a coder test his fix :-)

\* w32-io.c: Does now use reader threads, so that we can use WaitForMultipleObjects.

\* sema.h, posix-sema.c, w32-sema.c: Support for Critical sections. Does currently only work for W32.

\* debug.c, util.h : New. Changed all fprintfs to use this new set of debugging functions.

2001-01-23 Werner Koch <wk@gnupg.org>

\* data.c (\_gpgme\_data\_release\_and\_return\_string): Fixed string termination.

2001-01-22 Werner Koch <wk@gnupg.org>

\* delete.c: New.

\* signers.c: New.

\* key.c (gpgme\_key\_ref, gpgme\_key\_unref): New.

\* sign.c (gpgme\_op\_sign\_start): Allow the use of other keys.

\* version.c (gpgme\_get\_engine\_info, gpgme\_check\_engine): New.

\* runpgg.c (\_gpgme\_gpg\_set\_simple\_line\_handler): New.

2001-01-05 Werner Koch <wk@gnupg.org>

\* data.c (gpgme\_data\_rewind): Allow to rewind data\_type\_none.

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```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This program is free software; you can redistribute it and/or modify  
it under the terms of the GNU General Public License as published by  
the Free Software Foundation; either version 2 of the License, or  
(at your option) any later version.
```

```
This program is distributed in the hope that it will be useful,  
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MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the  
GNU General Public License for more details.
```

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You should have received a copy of the GNU General Public License  
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```

Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Also add information on how to contact you by electronic and paper mail.

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```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```
commit 2145348ec54c6027f2ea20f695de0277e2871405
Merge: 348ba88 2036f1a
Author: Ben McGinnes <ben@adversary.org>
Date: Wed May 6 03:04:19 2015 +1000
```

Merge pull request #4 from Hasimir/master

history

```
commit 2036f1a0a670a0561993e195c458059220b36114
Merge: dbabf0c 348ba88
Author: Ben McGinnes <ben@adversary.org>
Date: Wed May 6 02:57:44 2015 +1000
```

Merge branch 'master' of github:adversary-org/pyme3

commit dbabf0cf1f2985755c2293b619011832e34faa9c  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:52:23 2015 +1000

Added a short history

- \* A (very) brief summary of the project's history since 2002.
- \* Deals with why the commit log in the GPGME repo does not include the history of PyME.
- \* Mentions that intact git repos will be maintained, but not where they are (one will be on github, another will be in a user directory on playfair.gnupg.org).

docs/Short\_History.rst | 57 +++++  
1 file changed, 57 insertions(+)

commit 348ba883424778c711c04ae9b66035ccdb36eb8c  
Merge: 127d0a5 7c37a27  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:21:34 2015 +1000

Merge pull request #3 from Hasimir/master

Version release preparation

commit 7c37a27a6845c58222d4d947c2efbe38e955b612  
Merge: f692cff 127d0a5  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:17:14 2015 +1000

Merge branch 'master' of github:adversary-org/pyme3

commit f692cff50a89c2c61acdbd3d7dd60f5ce3cd15af  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:09:44 2015 +1000

TODO update

- \* Removed reference to GitHub, replaced with impending new home at gnupg.org.

docs/TODO.rst | 4 +--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit bd5ccf9e3bfe69fa681613757577e87b72ca08ec  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:00:44 2015 +1000

Version bump

- \* Bumped version number to 0.9.1 to keep it somewhat in line with the existing PyME project, even though there will be some divergence at some point (or even re-merging, depending on how many of the Python 3 modifications can be back-ported to the Python 2 version).
- \* Updated the author and copyright information to reflect the two current authors (Martin and I).
- \* Replaced Igor's contact details with mine.
- \* Replaced project home page with the GnuPG one.

pyme/version.py | 16 ++++++-----  
 1 file changed, 9 insertions(+), 7 deletions(-)

commit ec167512f4ca88d8f6e89e2ae831798c8283b4df  
 Author: Ben McGinnes <ben@adversary.org>  
 Date: Wed May 6 01:48:01 2015 +1000

README preparation.

- \* Changes in preparation for impending move of code to the GnuPG git server as a part of GPGME.

README.rst | 14 ++++++-----  
 1 file changed, 7 insertions(+), 7 deletions(-)

commit 8a48515e884c36b5bdb24a13cb4d2e49f4ee6f17  
 Author: Ben McGinnes <ben@adversary.org>  
 Date: Wed May 6 01:43:53 2015 +1000

TODO moved to docs

- \* As it says.

TODO.rst | 25 -----  
 docs/TODO.rst | 25 ++++++  
 2 files changed, 25 insertions(+), 25 deletions(-)

commit f968c777472f01f308f6e57eac1740bf5c76c205  
 Author: Ben McGinnes <ben@adversary.org>  
 Date: Sun May 3 16:52:13 2015 +1000

Started another TODO file.

TODO.rst | 25 ++++++  
 1 file changed, 25 insertions(+)

commit 127d0a56fa9f7ad1d4fb39d0b529b890a8d67365

Merge: db72dea 44837f6  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:59:44 2015 +1000

Merge pull request #2 from Hasimir/master

Minor editing.

commit 44837f6e50fc539c86aef1f75a6a3538b02029ea  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:56:55 2015 +1000

Minor editing.

- \* Fixed another URL.
- \* Changed Py3 version's version number to v0.9.1-beta0.

README.rst | 4 ++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit db72deaae19c3513391df040bc6a66a88d9213af  
Merge: db34286 48eb185  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:26:11 2015 +1000

Merge pull request #1 from Hasimir/master

Links

commit 48eb1856cb0739cc9f0b9084da9d965e1fc7fddd  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:22:30 2015 +1000

Links

- \* Fixed URLs for authors.
- \* Updated my entry to point to github location.
- \*\* I strongly suspect the result of this work will be concurrent projects, so preparing for that eventuality with this repo.

README.rst | 8 ++++----  
1 file changed, 4 insertions(+), 4 deletions(-)

commit db3428659783f30b9a76204403daedf9fc4cf7cf  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 11:29:00 2015 +1000

Explicit over Implicit ...

... isn't just for code.

- \* Removed the 2to3 working directory and its contents.
- \* Made the README.rst file a little more clear that this branch is for Python 3 (set Python 3.2 as a fairly arbitrary requirement for the moment, but will probably raise this to 3.3).

```
2to3/2to3-output-remaining.log | 60 ---
2to3/2to3-output-setup.log    | 35 --
2to3/2to3-output.log          | 950 -----
README.rst                    | 10 +-
4 files changed, 7 insertions(+), 1048 deletions(-)
```

commit 3edf07a4ba8a86af3a33246234d6e133074862af

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 11:19:41 2015 +1000

Added authors.

- \* In alphabetical order.
- \* Mine will need updating once Martin and I have decided what to do regarding the two main branches.

```
README.rst | 12 ++++++++
1 file changed, 12 insertions(+)
```

commit 811eb14b53e8856312d99f46b77215f7f9bd672c

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 10:23:00 2015 +1000

Docs and other things.

- \* Now able to import pyme.core without error, indicates port process is successful.
- \* Code is *not* compatible with the Python 2 version.
- \* Will need to consider making this a parallel project with the master branch.
- \* Got rid of the .org TODO file.
- \* Changed the README to use the reST file extension since it's full of reST anyway.

```
2to3/TODO.org | 5 -----
README.rst    | 32 ++++++++
README.txt    | 32 -----
3 files changed, 32 insertions(+), 37 deletions(-)
```

commit 79e784bdccel1de6f7856921b5431044c62c6f015

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 10:18:40 2015 +1000

Fixed another implicit import by making it explicit. Hopefully this is the last one.

pyme/util.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 2b52b46ccda3e7abcc50eed0745062259d698661

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 10:16:01 2015 +1000

Fixed another implicit import by making it explicit.

pyme/errors.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 409c8fd565e21f23cd41daaeffc867e6d23a0863

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 10:08:22 2015 +1000

Bytes vs. Unicode

\* Trying PyBytes instead of PyUnicode.

gpgme.i | 14 ++++++-----  
helpers.c | 8 +++++--  
2 files changed, 11 insertions(+), 11 deletions(-)

commit d8164aa2ae98bf8c807c16e2d9be12c5fba7cfd

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 09:22:58 2015 +1000

String to Unicode

\* Replaced all instances of PyString with PyUnicode (and hoping there's no byte data in there).

gpgme.i | 14 ++++++-----  
helpers.c | 8 +++++--  
2 files changed, 11 insertions(+), 11 deletions(-)

commit bd99b7865656e559b17c419c6b64b412a22c6c44

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 09:17:06 2015 +1000

PyInt\_AsLong

\* Replaced all instances of PyInt with PyLong, as per C API docs.

gpgme.i | 4 +++-

helpers.c | 8 ++++----

2 files changed, 6 insertions(+), 6 deletions(-)

commit 3c91e2ccf8ca788b51e3308e292c6b64888fdb15

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:59:36 2015 +1000

Import correction

\* Once pygpgme.py is generated and moved, it will be in the right directory for the explicit "from . import pygpgme" to be correct.

pyme/core.py | 2 +-

1 file changed, 1 insertion(+), 1 deletion(-)

commit 23a49e7070812ff1ce138d8d4cc46d0b80328897

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:38:29 2015 +1000

The -py3 flag.

Makefile | 2 +-

1 file changed, 1 insertion(+), 1 deletion(-)

commit b1549587d6db5e33081b9c20f75d1348a1d25938

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:01:42 2015 +1000

Fixed indentation - 4.

pyme/core.py | 2 +-

1 file changed, 1 insertion(+), 1 deletion(-)

commit a685142ce46761ee6f5176e90717176e38e0d24f

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:00:16 2015 +1000

Fixed indentation - 3.

pyme/core.py | 5 +++-

1 file changed, 2 insertions(+), 3 deletions(-)

commit 488a70b490cc64eb1c47d2483cb2f4079c6767f7

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:53:21 2015 +1000

Pet Peeve

```
def pet_peeve(self):  
    peeve = print("people who don't press return after a colon!")
```

FFS!

pyme/core.py | 5 +++--  
1 file changed, 3 insertions(+), 2 deletions(-)

commit a5d38eb47d64bb17bb609fe594dae2aca480bac9  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 04:47:54 2015 +1000

Fixed indentation - 2.

pyme/core.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 476a207f732b8559abb1ea3c23147c0e34804730  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 04:46:01 2015 +1000

Fixed indentation.

pyme/core.py | 4 +++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit 0572900eba9bcd9b0283c7d8e022e8972f06f9f8  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 04:43:49 2015 +1000

Replaced all tabs with 4 spaces.

pyme/core.py | 18 ++++++++-----  
1 file changed, 9 insertions(+), 9 deletions(-)

commit 78c0b7677e94ce1e11b8cdb833a9064527187330  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 04:39:07 2015 +1000

SWIG flags in the wrong place.

Makefile | 4 +++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit dfa7f2589963494a8f89277560d8c1116604a3c8

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:35:09 2015 +1000

Fixed subprocess call for swig (again).

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 249bfd8c714dcda53127b99b6cc8a6c7c4a99f20

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:32:40 2015 +1000

Fixed subprocess call for swig.

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 6fd7e719cf4c975f466ceb39835db7007df36fb2

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 03:51:48 2015 +1000

Linking swig to py3

\* Changed the swig invocations to run with the -python -py3 flags explicitly.

Makefile | 4 ++--  
setup.py | 2 +-  
2 files changed, 3 insertions(+), 3 deletions(-)

commit 7a6b584f50ed6ddc8617a642185eea1f24ff791a

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 11:12:00 2015 +1000

String fun

\* streamlined confdata details, including decoding strom binary to string.

setup.py | 4 +---  
1 file changed, 1 insertion(+), 3 deletions(-)

commit f7fd3f270592021a95a8f779bfe85ac18f4e390b

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:46:59 2015 +1000

Open File

\* Removed deprecated file() and replaced with open().

examples/PyGtkGpgKeys.py | 2 +-  
examples/pygpa.py | 6 +++---  
gpgme-h-clean.py | 2 +-  
3 files changed, 5 insertions(+), 5 deletions(-)

commit 4227d486f9558015e7e548d71085e58e1b50ec08

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:36:15 2015 +1000

print() fix

\* Makefile includes a python print, changed from statement to function.

Makefile | 2 +-

1 file changed, 1 insertion(+), 1 deletion(-)

commit 406f7f2567b701502186fe0a325dc2a3491ff7f8

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:28:42 2015 +1000

Updated Makefile

\* set make to use python3 instead.

\* This will mean a successful port may need to be maintained separately from the original python2 code instead of merged, but ought to be able to share most things. So maybe merge with separated make files or a pre-make script to set python2 or python3 prior to building ... decide later, after it works.

Makefile | 6 +++---

1 file changed, 3 insertions(+), 3 deletions(-)

commit 90b3efa5b193d37e08dc9b4ee766ba9ebc9412af

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:15:20 2015 +1000

Env and a little license issue

\* Updated all the /usr/bin/env paths to point to python3.

\* Also fixed the hard coded /usr/bin/python paths.

\* Updated part of setup.py which gave the impression this package was only licensed under the GPL (it's actually licensed under the LGPL as well, essentially the same dual licensing as the GPGME library).

examples/PyGtkGpgKeys.py | 2 +-

examples/delkey.py | 2 +-

examples/encrypt-to-all.py | 2 +-

examples/exportimport.py | 2 +-

```
examples/genkey.py      | 2 +-
examples/inter-edit.py | 2 +-
examples/pygpa.py      | 2 +-
examples/sign.py       | 2 +-
examples/signverify.py | 2 +-
examples/simple.py     | 2 +-
examples/t-edit.py     | 2 +-
examples/testCMSgetkey.py | 2 +-
examples/verifydetails.py | 2 +-
gpgme-h-clean.py      | 2 +-
setup.py               | 4 ++--
```

15 files changed, 16 insertions(+), 16 deletions(-)

commit 1a4b55dbccd2774344352e579130bf494bc5fa4b

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 08:50:54 2015 +1000

Removed extraneous files.

\* The two .bak files.

```
pyme/errors.py.bak | 46 -----
setup.py.bak      | 116 -----
```

2 files changed, 162 deletions(-)

commit 208879d4f2a6d0514c3f8ee2fc0da8bba42350de

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 08:19:37 2015 +1000

Added TODO.org

\* TODO list in Emacs org-mode.

\* Will eventually be removed along with this entire directory when the porting process is complete.

```
2to3/TODO.org | 5 +++++
```

1 file changed, 5 insertions(+)

commit 1548bf201059638675c5387c6f124d4b703363a9

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 07:58:40 2015 +1000

2to3 conversion of remaining files

\* Ran the extended version against all the unmodified python files.

\* Only pyme/errors.py required additional work.

```
2to3/2to3-output-remaining.log | 60 ++++++
```

pyme/errors.py | 2 +-  
pyme/errors.py.bak | 46 +++++  
3 files changed, 107 insertions(+), 1 deletion(-)

commit 1230650bc6bbe4c14d1284f7877aa932f3e86eb4

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 07:50:39 2015 +1000

2to3 conversion of setup.py

\* Ran extended 2to3 command to produce python 3 code for setup.py.

\* Effectively testing for what to run against the other originally unmodified py2 files.

2to3/2to3-output-setup.log | 35 +++++

setup.py | 7 +-

setup.py.bak | 116 +++++

3 files changed, 154 insertions(+), 4 deletions(-)

commit edad44955f59aa879e95a369591717fb19eec6b7

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:50:07 2015 +1000

Removing 2to3 generated .bak files.

\* Not really needed with a real VCS, but couldn't hurt to have them for a couple of revisions. ;)

examples/PyGtkGpgKeys.py.bak | 663 -----  
examples/encrypt-to-all.py.bak | 65 --  
examples/exportimport.py.bak | 75 --  
examples/genkey.py.bak | 45 -  
examples/inter-edit.py.bak | 57 --  
examples/pygpa.py.bak | 1457 -----  
examples/sign.py.bak | 31 -  
examples/signverify.py.bak | 78 --  
examples/simple.py.bak | 52 --  
examples/t-edit.py.bak | 59 --  
examples/testCMSgetkey.py.bak | 45 -  
examples/verifydetails.py.bak | 100 ---  
gpgme-h-clean.py.bak | 42 -  
pyme/callbacks.py.bak | 47 --  
pyme/constants/data/\_\_init\_\_.py.bak | 4 -  
pyme/constants/keylist/\_\_init\_\_.py.bak | 4 -  
pyme/constants/sig/\_\_init\_\_.py.bak | 4 -  
pyme/core.py.bak | 463 -----  
pyme/util.py.bak | 72 --  
pyme/version.py.bak | 41 -

20 files changed, 3404 deletions(-)

commit 1cfc3c969f885ed191610bffb60ac23fdd349e

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:45:50 2015 +1000

2to3 conversion log

\* The output of the command to convert the code from Python 2 to 3.

\* Note: this contains the list of files which were not modified and which will or may need to be modified.

2to3/2to3-output.log | 950 +++  
1 file changed, 950 insertions(+)

commit 078f6cf878aa62d12704fab424198a613a24cc8c

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:36:58 2015 +1000

2to3 conversion of pyme master

\* Branch from commit 459f3eca659b4949e394c4a032d9ce2053e6c721

\* Ran this: or x in `find . | egrep .py\$` ; do 2to3 -w \$x; done ;

\* Multiple files not modified, will record elsewhere (see next commit).

|                                |  |
|--------------------------------|--|
| examples/PyGtkGpgKeys.py       | 10 +-                                      |
| examples/PyGtkGpgKeys.py.bak   | 663 +++++++++++++++++++++++++++++++++      |
| examples/encrypt-to-all.py     | 12 +-                                      |
| examples/encrypt-to-all.py.bak | 65 ++                                      |
| examples/exportimport.py       | 20 +-                                      |
| examples/exportimport.py.bak   | 75 ++                                      |
| examples/genkey.py             | 2 +-                                       |
| examples/genkey.py.bak         | 45 +                                       |
| examples/inter-edit.py         | 8 +-                                       |
| examples/inter-edit.py.bak     | 57 ++                                      |
| examples/pygpa.py              | 40 +-                                      |
| examples/pygpa.py.bak          | 1457 +++++++++++++++++++++++++++++++++++++ |
| examples/sign.py               | 2 +-                                       |
| examples/sign.py.bak           | 31 +                                       |
| examples/signverify.py         | 18 +-                                      |
| examples/signverify.py.bak     | 78 ++                                      |
| examples/simple.py             | 8 +-                                       |
| examples/simple.py.bak         | 52 ++                                      |
| examples/t-edit.py             | 12 +-                                      |
| examples/t-edit.py.bak         | 59 ++                                      |
| examples/testCMSgetkey.py      | 8 +-                                       |
| examples/testCMSgetkey.py.bak  | 45 +                                       |
| examples/verifydetails.py      | 34 +-                                      |

```
examples/verifydetails.py.bak    | 100 +++
gpgme-h-clean.py                |  2 +-
gpgme-h-clean.py.bak            | 42 +
pyme/callbacks.py               |  6 +-
pyme/callbacks.py.bak           | 47 ++
pyme/constants/data/__init__.py  |  2 +-
pyme/constants/data/__init__.py.bak |  4 +
pyme/constants/keylist/__init__.py |  2 +-
pyme/constants/keylist/__init__.py.bak |  4 +
pyme/constants/sig/__init__.py   |  2 +-
pyme/constants/sig/__init__.py.bak |  4 +
pyme/core.py                    | 26 +-
pyme/core.py.bak                 | 463 ++++++++
pyme/util.py                     |  6 +-
pyme/util.py.bak                 | 72 ++
pyme/version.py                  |  2 +-
pyme/version.py.bak              | 41 +
40 files changed, 3515 insertions(+), 111 deletions(-)
```

commit 459f3eca659b4949e394c4a032d9ce2053e6c721

Merge: c5966ab dae7f14

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Wed Jul 9 10:48:33 2014 +0100

Merged in jerrykan/pyme/fix\_setup\_26 (pull request #1)

Provide support for using setup.py with Python v2.6

commit dae7f14a54e6c2bde0ad4da7308cc7fc0d0c0469

Author: John Kristensen <john.kristensen@dpipwe.tas.gov.au>

Date: Wed Jul 9 15:54:39 2014 +1000

Provide support for using setup.py with Python v2.6

The setup.py script uses subprocess.check\_output() which was introduced in Python v2.7. The equivalent functionality can be achieved without adding much extra code and provide support for Python v2.6.

```
setup.py | 4 +++-
```

1 file changed, 3 insertions(+), 1 deletion(-)

commit c5966abec9d772b3922d32650da288fd50a217be

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Thu May 15 19:43:00 2014 +0100

README.txt in ReST, including headlines

```
README.txt | 8 ++++++--
```

1 file changed, 6 insertions(+), 2 deletions(-)

commit 43ee8c6f34fa9b6d3975aa6ea60b3d4a741fa721  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Thu May 15 19:37:15 2014 +0100

README.txt in ReST

README.txt | 25 ++++++-----  
1 file changed, 13 insertions(+), 12 deletions(-)

commit f71a369484cba8801df23ccc5842335fa496c0df  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Thu May 15 19:28:12 2014 +0100

added MANIFEST.in and README.txt (instead of .md)

MANIFEST.in | 6 ++++++  
README.md | 27 -----  
README.txt | 27 ++++++  
3 files changed, 33 insertions(+), 27 deletions(-)

commit d0d6755229f920b0bed043e9c2731de2d57c096c  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Tue May 13 09:52:44 2014 +0100

added mailing list to README

README.md | 19 ++++++---  
1 file changed, 16 insertions(+), 3 deletions(-)

commit 30ca60ddf92df684de261cb24c83c68089be0adc  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sun May 11 13:34:28 2014 +0100

we don't need a separate out of date ChangeLog file

ChangeLog | 802 -----  
1 file changed, 802 deletions(-)

commit 8263f1a6d38fdb7f5f3dd5c7e28f83caa7528a08  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sun May 11 13:32:31 2014 +0100

adding README.md

README.md | 14 ++++++  
1 file changed, 14 insertions(+)

commit 3fc71b47e9e14b0b984801c28d722723baa4b406  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:43:06 2014 +0100

ValueError -> RuntimeError

setup.py | 4 +++-  
1 file changed, 2 insertions(+), 2 deletions(-)

commit eec432abea56296b9fa36aac0d10926a2335b739  
Merge: eea6537 d2738b3  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:41:02 2014 +0100

Merge branch 'master' of bitbucket.org:malb/pyme

Conflicts:  
setup.py

commit eea6537921061b4dcfc54e00a99d3fa110e71433  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:39:51 2014 +0100

check for swig

setup.py | 8 ++++++++  
1 file changed, 8 insertions(+)

commit 53867bf9715ee1b4ea873bf5e2fbb7d9740a2b4a  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:35:04 2014 +0100

more friendly error message if gpgme is missing

setup.py | 8 ++++++-  
1 file changed, 7 insertions(+), 1 deletion(-)

commit d2738b35d63b1492d69641c5466103685f2d3a30  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:35:04 2014 +0100

more friendly error message if gpgme is missing

setup.py | 8 ++++++-  
1 file changed, 7 insertions(+), 1 deletion(-)

commit c0b01240becf8ba6cf1d4c1f64b2cb4c056f5163

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Fri May 9 15:20:24 2014 +0100

version number should have three digits

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 6672bb60b9bec60d38e854016c48658b57774578

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Wed May 7 15:11:08 2014 +0100

bump version number for upcoming release

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 7bd6de700f33ca5d1f27bc16ebbd401f21d2e788

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:36:25 2014 +0100

bump version number to indicate changes

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 4fb6bd9b3f47c1a343242ac83b326cacd12a136e

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:34:07 2014 +0100

pyme instead of pygpgme

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 9548973138d78241a45ccb82333b25f2cf36ce7d

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:31:10 2014 +0100

dirty hack to make 'python setup.py install' work

setup.py | 7 ++++---  
1 file changed, 4 insertions(+), 3 deletions(-)

commit a961d7eab9db478b7e603324bc5d243bd3c84bad

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:05:44 2014 +0100

moved everything down to the toplevel directory

|                                    |               |
|------------------------------------|---------------|
| COPYING                            | 340 ++        |
| COPYING.LESSER                     | 510 +++       |
| ChangeLog                          | 802 +++++     |
| INSTALL                            | 15 +          |
| Makefile                           | 104 +         |
| debian/README.Debian               | 6 +           |
| debian/changelog                   | 93 +          |
| debian/control                     | 34 +          |
| debian/copyright                   | 25 +          |
| debian/docs                        | 2 +           |
| debian/examples                    | 2 +           |
| debian/rules                       | 99 +          |
| examples/PyGtkGpgKeys.glade        | 1394 ++++++++ |
| examples/PyGtkGpgKeys.gladep       | 8 +           |
| examples/PyGtkGpgKeys.py           | 663 ++++      |
| examples/delkey.py                 | 34 +          |
| examples/encrypt-to-all.py         | 65 +          |
| examples/exportimport.py           | 75 +          |
| examples/genkey.py                 | 45 +          |
| examples/inter-edit.py             | 57 +          |
| examples/pygpa.glade               | 5546 ++++++   |
| examples/pygpa.py                  | 1457 ++++++   |
| examples/sign.py                   | 31 +          |
| examples/signverify.py             | 78 +          |
| examples/simple.py                 | 52 +          |
| examples/t-edit.py                 | 59 +          |
| examples/testCMSgetkey.py          | 45 +          |
| examples/verifydetails.py          | 100 +         |
| gpgme-h-clean.py                   | 42 +          |
| gpgme.i                            | 267 ++        |
| helpers.c                          | 154 +         |
| helpers.h                          | 36 +          |
| pyme/COPYING                       | 340 --        |
| pyme/COPYING.LESSER                | 510 ---       |
| pyme/ChangeLog                     | 802 -----     |
| pyme/INSTALL                       | 15 -          |
| pyme/Makefile                      | 104 -         |
| pyme/__init__.py                   | 137 +         |
| pyme/callbacks.py                  | 47 +          |
| pyme/constants/__init__.py         | 7 +           |
| pyme/constants/data/__init__.py    | 4 +           |
| pyme/constants/data/encoding.py    | 20 +          |
| pyme/constants/event.py            | 20 +          |
| pyme/constants/import.py           | 20 +          |
| pyme/constants/keylist/__init__.py | 4 +           |
| pyme/constants/keylist/mode.py     | 20 +          |

|   |            |
|---|------------|
| pyme/constants/md.py                    | 20 +       |
| pyme/constants/pk.py                    | 20 +       |
| pyme/constants/protocol.py              | 20 +       |
| pyme/constants/sig/__init__.py          | 4 +        |
| pyme/constants/sig/mode.py              | 20 +       |
| pyme/constants/sigsum.py                | 20 +       |
| pyme/constants/status.py                | 20 +       |
| pyme/constants/validity.py              | 20 +       |
| pyme/core.py                            | 463 +++    |
| pyme/debian/README.Debian               | 6 -        |
| pyme/debian/changelog                   | 93 -       |
| pyme/debian/control                     | 34 -       |
| pyme/debian/copyright                   | 25 -       |
| pyme/debian/docs                        | 2 -        |
| pyme/debian/examples                    | 2 -        |
| pyme/debian/rules                       | 99 -       |
| pyme/errors.py                          | 46 +       |
| pyme/examples/PyGtkGpgKeys.glade        | 1394 ----- |
| pyme/examples/PyGtkGpgKeys.gladep       | 8 -        |
| pyme/examples/PyGtkGpgKeys.py           | 663 ----   |
| pyme/examples/delkey.py                 | 34 -       |
| pyme/examples/encrypt-to-all.py         | 65 -       |
| pyme/examples/exportimport.py           | 75 -       |
| pyme/examples/genkey.py                 | 45 -       |
| pyme/examples/inter-edit.py             | 57 -       |
| pyme/examples/pygpa.glade               | 5546 ----- |
| pyme/examples/pygpa.py                  | 1457 ----- |
| pyme/examples/sign.py                   | 31 -       |
| pyme/examples/signverify.py             | 78 -       |
| pyme/examples/simple.py                 | 52 -       |
| pyme/examples/t-edit.py                 | 59 -       |
| pyme/examples/testCMSgetkey.py          | 45 -       |
| pyme/examples/verifydetails.py          | 100 -      |
| pyme/gpgme-h-clean.py                   | 42 -       |
| pyme/gpgme.i                            | 267 --     |
| pyme/helpers.c                          | 154 -      |
| pyme/helpers.h                          | 36 -       |
| pyme/pyme/__init__.py                   | 137 -      |
| pyme/pyme/callbacks.py                  | 47 -       |
| pyme/pyme/constants/__init__.py         | 7 -        |
| pyme/pyme/constants/data/__init__.py    | 4 -        |
| pyme/pyme/constants/data/encoding.py    | 20 -       |
| pyme/pyme/constants/event.py            | 20 -       |
| pyme/pyme/constants/import.py           | 20 -       |
| pyme/pyme/constants/keylist/__init__.py | 4 -        |
| pyme/pyme/constants/keylist/mode.py     | 20 -       |
| pyme/pyme/constants/md.py               | 20 -       |
| pyme/pyme/constants/pk.py               | 20 -       |

```

pyme/pyme/constants/protocol.py      | 20 -
pyme/pyme/constants/sig/__init__.py  | 4 -
pyme/pyme/constants/sig/mode.py      | 20 -
pyme/pyme/constants/sigsum.py        | 20 -
pyme/pyme/constants/status.py        | 20 -
pyme/pyme/constants/validity.py      | 20 -
pyme/pyme/core.py                    | 463 ---
pyme/pyme/errors.py                  | 46 -
pyme/pyme/util.py                    | 72 -
pyme/pyme/version.py                 | 41 -
pyme/setup.py                        | 99 -
pyme/util.py                         | 72 +
pyme/version.py                      | 41 +
setup.py                             | 99 +
108 files changed, 13384 insertions(+), 13384 deletions(-)

```

```

commit 8148cdd424c434e833ce427612ea8c89abc6e41c
Author: Martin Albrecht <martinralbrecht@googlemail.com>
Date: Sat May 3 18:58:52 2014 +0100

```

removing pyme-web

```

pyme-web/Makefile                    | 15 -
pyme-web/default.css                 | 37 --
pyme-web/doc/gpgme/ASCII-Armor.html  | 57 ---
pyme-web/doc/gpgme/Advanced-Key-Editing.html | 98 ----
pyme-web/doc/gpgme/Algorithms.html   | 47 --
pyme-web/doc/gpgme/Building-the-Source.html | 82 ----
.../doc/gpgme/Callback-Based-Data-Buffers.html | 148 -----
pyme-web/doc/gpgme/Cancellation.html | 67 ---
pyme-web/doc/gpgme/Concept-Index.html | 186 -----
pyme-web/doc/gpgme/Context-Attributes.html | 52 --
pyme-web/doc/gpgme/Contexts.html     | 61 ---
pyme-web/doc/gpgme/Creating-Contexts.html | 49 --
pyme-web/doc/gpgme/Creating-Data-Buffers.html | 47 --
pyme-web/doc/gpgme/Creating-a-Signature.html | 143 -----
pyme-web/doc/gpgme/Crypto-Engine.html | 79 ---
pyme-web/doc/gpgme/Crypto-Operations.html | 67 ---
.../doc/gpgme/Cryptographic-Message-Syntax.html | 42 --
.../doc/gpgme/Data-Buffer-I_002fO-Operations.html | 104 ----
pyme-web/doc/gpgme/Data-Buffer-Meta_002dData.html | 100 ----
pyme-web/doc/gpgme/Decrypt-and-Verify.html | 79 ---
pyme-web/doc/gpgme/Decrypt.html      | 123 -----
pyme-web/doc/gpgme/Deleting-Keys.html | 67 ---
pyme-web/doc/gpgme/Destroying-Contexts.html | 46 --
pyme-web/doc/gpgme/Destroying-Data-Buffers.html | 70 ---
pyme-web/doc/gpgme/Encrypt.html      | 45 --
pyme-web/doc/gpgme/Encrypting-a-Plaintext.html | 147 -----

```

|  |           |
|--|-----------|
| pyme-web/doc/gpgme/Engine-Configuration.html       | 65 ---    |
| pyme-web/doc/gpgme/Engine-Information.html         | 119 ----- |
| pyme-web/doc/gpgme/Engine-Version-Check.html       | 48 --     |
| pyme-web/doc/gpgme/Error-Codes.html                | 133 ----- |
| pyme-web/doc/gpgme/Error-Handling.html             | 72 ---    |
| pyme-web/doc/gpgme/Error-Sources.html              | 89 ----   |
| pyme-web/doc/gpgme/Error-Strings.html              | 80 ---    |
| pyme-web/doc/gpgme/Error-Values.html               | 159 ----- |
| pyme-web/doc/gpgme/Exchanging-Data.html            | 58 ---    |
| pyme-web/doc/gpgme/Exporting-Keys.html             | 101 ----  |
| pyme-web/doc/gpgme/Features.html                   | 59 ---    |
| pyme-web/doc/gpgme/File-Based-Data-Buffers.html    | 74 ---    |
| pyme-web/doc/gpgme/Function-and-Data-Index.html    | 229 ----- |
| pyme-web/doc/gpgme/Generating-Keys.html            | 144 ----- |
| pyme-web/doc/gpgme/Getting-Started.html            | 55 ---    |
| pyme-web/doc/gpgme/Hash-Algorithms.html            | 59 ---    |
| pyme-web/doc/gpgme/Header.html                     | 53 --     |
| .../doc/gpgme/I_002fO-Callback-Example-GDK.html    | 85 ----   |
| .../gpgme/I_002fO-Callback-Example-GTK_002b.html   | 86 ----   |
| .../doc/gpgme/I_002fO-Callback-Example-Qt.html     | 99 ----   |
| pyme-web/doc/gpgme/I_002fO-Callback-Example.html   | 259 ----- |
| pyme-web/doc/gpgme/I_002fO-Callback-Interface.html | 142 ----- |
| pyme-web/doc/gpgme/Importing-Keys.html             | 171 ----- |
| pyme-web/doc/gpgme/Included-Certificates.html      | 70 ---    |
| pyme-web/doc/gpgme/Information-About-Keys.html     | 207 ----- |
| .../doc/gpgme/Information-About-Trust-Items.html   | 75 ---    |
| pyme-web/doc/gpgme/Introduction.html               | 53 --     |
| pyme-web/doc/gpgme/Key-Listing-Mode.html           | 99 ----   |
| pyme-web/doc/gpgme/Key-Management.html             | 260 ----- |
| pyme-web/doc/gpgme/Key-Signatures.html             | 130 ----  |
| .../doc/gpgme/Largefile-Support-_0028LFS_0029.html | 110 ----  |
| pyme-web/doc/gpgme/Library-Copying.html            | 542 ----- |
| pyme-web/doc/gpgme/Library-Version-Check.html      | 97 ----   |
| pyme-web/doc/gpgme/Listing-Keys.html               | 204 ----- |
| pyme-web/doc/gpgme/Listing-Trust-Items.html        | 88 ----   |
| pyme-web/doc/gpgme/Locale.html                     | 69 ---    |
| pyme-web/doc/gpgme/Manipulating-Data-Buffers.html  | 45 --     |
| pyme-web/doc/gpgme/Manipulating-Keys.html          | 63 ---    |
| pyme-web/doc/gpgme/Manipulating-Trust-Items.html   | 62 ---    |
| pyme-web/doc/gpgme/Memory-Based-Data-Buffers.html  | 107 ----  |
| pyme-web/doc/gpgme/Multi-Threading.html            | 93 ----   |
| pyme-web/doc/gpgme/OpenPGP.html                    | 44 --     |
| pyme-web/doc/gpgme/Overview.html                   | 57 ---    |
| pyme-web/doc/gpgme/Passphrase-Callback.html        | 101 ----  |
| pyme-web/doc/gpgme/Preparation.html                | 54 --     |
| pyme-web/doc/gpgme/Progress-Meter-Callback.html    | 80 ---    |
| pyme-web/doc/gpgme/Protocol-Selection.html         | 60 ---    |
| pyme-web/doc/gpgme/Protocols-and-Engines.html      | 82 ----   |

```

pyme-web/doc/gpgme/Public-Key-Algorithms.html | 74 ---
.../doc/gpgme/Registering-I_002fO-Callbacks.html | 81 ---
pyme-web/doc/gpgme/Run-Control.html | 53 --
pyme-web/doc/gpgme/Selecting-Signers.html | 64 ---
pyme-web/doc/gpgme/Sign.html | 50 --
pyme-web/doc/gpgme/Signal-Handling.html | 61 ---
pyme-web/doc/gpgme/Signature-Notation-Data.html | 85 ----
pyme-web/doc/gpgme/Text-Mode.html | 63 ---
pyme-web/doc/gpgme/Trust-Item-Management.html | 68 ---
pyme-web/doc/gpgme/Using-Automake.html | 74 ---
pyme-web/doc/gpgme/Using-External-Event-Loops.html | 74 ---
pyme-web/doc/gpgme/Using-Libtool.html | 44 --
pyme-web/doc/gpgme/Verify.html | 492 -----
pyme-web/doc/gpgme/Waiting-For-Completion.html | 77 ---
pyme-web/doc/gpgme/index.html | 169 -----
pyme-web/doc/pyme/index.html | 164 -----
pyme-web/doc/pyme/pyme.callbacks.html | 42 --
.../doc/pyme/pyme.constants.data.encoding.html | 48 --
pyme-web/doc/pyme/pyme.constants.data.html | 29 --
pyme-web/doc/pyme/pyme.constants.event.html | 48 --
pyme-web/doc/pyme/pyme.constants.html | 39 --
pyme-web/doc/pyme/pyme.constants.import.html | 49 --
pyme-web/doc/pyme/pyme.constants.keylist.html | 29 --
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 49 --
pyme-web/doc/pyme/pyme.constants.md.html | 58 ---
pyme-web/doc/pyme/pyme.constants.pk.html | 50 --
pyme-web/doc/pyme/pyme.constants.protocol.html | 48 --
pyme-web/doc/pyme/pyme.constants.sig.html | 29 --
pyme-web/doc/pyme/pyme.constants.sig.mode.html | 47 --
pyme-web/doc/pyme/pyme.constants.sigsum.html | 55 ---
pyme-web/doc/pyme/pyme.constants.status.html | 126 ----
pyme-web/doc/pyme/pyme.constants.validity.html | 50 --
pyme-web/doc/pyme/pyme.core.html | 277 -----
pyme-web/doc/pyme/pyme.errors.html | 82 ----
pyme-web/doc/pyme/pyme.html | 164 -----
pyme-web/doc/pyme/pyme.util.html | 81 ---
pyme-web/doc/pyme/pyme.version.html | 37 --
pyme-web/index.html | 72 ---
112 files changed, 10551 deletions(-)

```

commit 684d95feb7e10e538a56fb1b27f1456111bacb60

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Mon Jan 6 17:44:20 2014 +0100

fixing op\_export\_keys()

the conversion of gpgme\_key\_t [] was restricted to gpgme\_key\_t [] with the name recv, i.e. only the use-cases of encryption were covered.

see: [http://sourceforge.net/mailarchive/forum.php?forum\\_name=pyme-help&max\\_rows=25&style=nested&viewmonth=201309](http://sourceforge.net/mailarchive/forum.php?forum_name=pyme-help&max_rows=25&style=nested&viewmonth=201309)

pyme/gpgme.i | 6 +++---

1 file changed, 3 insertions(+), 3 deletions(-)

commit 658d23b95110d21eeb50abf4e74701a667521a88

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Mon Jan 6 17:41:33 2014 +0100

deleting CVSROOT

CVSROOT/checkoutlist | 13 -----

CVSROOT/commitinfo | 15 -----

CVSROOT/config | 21 -----

CVSROOT/cvswrappers | 19 -----

CVSROOT/editinfo | 21 -----

CVSROOT/loginfo | 26 -----

CVSROOT/modules | 26 -----

CVSROOT/notify | 12 -----

CVSROOT/rcsinfo | 13 -----

CVSROOT/taginfo | 20 -----

CVSROOT/verifymsg | 21 -----

11 files changed, 207 deletions(-)

commit 576b555499c094c4786d42de9e59aa9826009b89

Author: convert-repo <devnull@localhost>

Date: Mon Jan 6 15:22:44 2014 +0000

update tags

commit 2dcf0c5b702eb5a18c66ff1e42a72eaa7427af1d

Author: belyi <devnull@localhost>

Date: Wed Nov 26 02:38:33 2008 +0000

Move Windows specific fix from helpers.c to helpers.h so that it works for edit callback as well as for the passphrase one.

pyme/helpers.c | 5 -----

pyme/helpers.h | 5 +++++

2 files changed, 5 insertions(+), 5 deletions(-)

commit 42a035f2ef62470fea7a7f8ee33a1297fa90a603

Author: belyi <devnull@localhost>

Date: Mon Nov 24 21:44:30 2008 +0000

Update the way build directives are constructed on MinGW to have a bit

more robust. Update PyMe build version to 0.8.1 in version.py

pyme/pyme/version.py | 2 +-  
pyme/setup.py | 10 ++++++---  
2 files changed, 9 insertions(+), 3 deletions(-)

commit 3aaa20fbcba17066c9ffd580f5209946022793a2  
Author: belyi <devnull@localhost>  
Date: Mon Nov 24 06:57:11 2008 +0000

Update changelog

pyme/debian/changelog | 5 ++++-  
1 file changed, 4 insertions(+), 1 deletion(-)

commit 689ff46b2550547e3883f809a6dc40c22c3e137e  
Author: belyi <devnull@localhost>  
Date: Mon Nov 24 06:50:41 2008 +0000

Fix hang problem on Windows when password is written to a filehandle.  
Fix the way path is constructed on MinGW platform.

pyme/helpers.c | 5 +++++  
pyme/setup.py | 4 +++-  
2 files changed, 7 insertions(+), 2 deletions(-)

commit 852a60d541d66cb56f40378182b976fd87a02c46  
Author: belyi <devnull@localhost>  
Date: Sun Nov 23 04:31:31 2008 +0000

Add Bernard's example testCMSgetkey.py and his updates for  
verifydetails.py

pyme/examples/testCMSgetkey.py | 45 +++  
pyme/examples/verifydetails.py | 43 +++++++++++++++++++++++++++++++++++++-----  
2 files changed, 77 insertions(+), 11 deletions(-)

commit f080527d9184f3360f0a8ef6136b9a188d8e7d2a  
Author: belyi <devnull@localhost>  
Date: Thu May 29 18:29:37 2008 +0000

Remove debian packaging for python2.3 since it is removed from both  
testing and unstable dists.  
Update docs build target to have correct PYTHONPATH set.

pyme/Makefile | 2 +-  
pyme/debian/changelog | 4 +++-  
pyme/debian/control | 4 +++-

pyme/debian/rules | 2 --  
4 files changed, 6 insertions(+), 6 deletions(-)

commit c25d133fcbadf3c7f6e655586b4a05d6e3cf6f0b  
Author: belyi <devnull@localhost>  
Date: Thu Apr 3 13:37:12 2008 +0000

Forgot to adjust mainText margin. Doing it now.

pyme-web/default.css | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 897286a54a32336d060cd03305cdec7905f34f1  
Author: belyi <devnull@localhost>  
Date: Thu Apr 3 13:00:11 2008 +0000

Fix an error in default.css and make index.html "Standards Compliant".

pyme-web/default.css | 2 +-  
pyme-web/index.html | 7 ++++---  
2 files changed, 5 insertions(+), 4 deletions(-)

commit 4e049212bd214449cc0ba1ce06e00782783f328a  
Author: belyi <devnull@localhost>  
Date: Thu Apr 3 12:38:42 2008 +0000

Adjust spacing between links.

pyme-web/default.css | 9 ++++++---  
1 file changed, 6 insertions(+), 3 deletions(-)

commit cb2bddfbd77483b1deb14f2eab0715a03dd33fcd  
Author: belyi <devnull@localhost>  
Date: Wed Apr 2 22:50:21 2008 +0000

Make style a big more IE friendly.

pyme-web/default.css | 15 ++++++++-----  
1 file changed, 11 insertions(+), 4 deletions(-)

commit ad66f0a1bb01b46baac328e9fee439b35a60c232  
Author: belyi <devnull@localhost>  
Date: Wed Apr 2 11:58:32 2008 +0000

Make GPGME documentation a bit more web friendly on the index.html page.

pyme-web/doc/gpgme/Algorithms.html | 2 +-  
pyme-web/doc/gpgme/Concept-Index.html | 2 +-  

---

```
pyme-web/doc/gpgme/Contexts.html      | 2 +-
pyme-web/doc/gpgme/Error-Handling.html | 2 +-
pyme-web/doc/gpgme/Exchanging-Data.html | 2 +-
pyme-web/doc/gpgme/Function-and-Data-Index.html | 2 +-
pyme-web/doc/gpgme/Introduction.html   | 4 +-
pyme-web/doc/gpgme/Library-Copying.html | 2 +-
pyme-web/doc/gpgme/Preparation.html     | 2 +-
pyme-web/doc/gpgme/Protocols-and-Engines.html | 2 +-
pyme-web/doc/gpgme/index.html          | 229 +-----
11 files changed, 12 insertions(+), 239 deletions(-)
```

commit 4f57c0ccb049d4442e7732e2d1d05dabffd2a21d

Author: belyi <devnull@localhost>

Date: Wed Apr 2 06:12:57 2008 +0000

Add missing core.set\_locale() to set default locale for contexts.

```
pyme/debian/changelog | 2 +-
pyme/pyme/core.py      | 4 ++++
2 files changed, 5 insertions(+), 1 deletion(-)
```

commit acf7ead3dea8590cf9fe86b67bb125837ad6ed4f

Author: belyi <devnull@localhost>

Date: Wed Apr 2 05:50:24 2008 +0000

Avoid leaks caused by keys.  
Add set/get methods for engine info.

```
pyme/debian/changelog | 10 ++++++++
pyme/pyme/core.py     | 24 ++++++++
2 files changed, 34 insertions(+)
```

commit df4a2fb518adbb6420d95ce74af212c87abff7e7

Author: belyi <devnull@localhost>

Date: Wed Apr 2 04:04:41 2008 +0000

Update index.html to reflect new versions on the web.

```
pyme-web/Makefile      | 3 +-
pyme-web/doc/gpgme/index.html | 4 +---
pyme-web/index.html    | 4 +-
3 files changed, 5 insertions(+), 6 deletions(-)
```

commit bd3ffc9bdf98d6aafde6b689c6c8215fa468612d

Author: belyi <devnull@localhost>

Date: Wed Apr 2 04:01:04 2008 +0000

Update PyMe documentation to match 0.8.0 version of the package.

```
pyme-web/doc/pyme/index.html | 14 ++++-----
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 1 +
pyme-web/doc/pyme/pyme.constants.protocol.html | 4 +-
pyme-web/doc/pyme/pyme.constants.status.html | 9 ++++++
pyme-web/doc/pyme/pyme.core.html | 36 ++++++-----
pyme-web/doc/pyme/pyme.errors.html | 8 +++-
pyme-web/doc/pyme/pyme.html | 14 ++++-----
pyme-web/doc/pyme/pyme.util.html | 17 ++++++---
pyme-web/doc/pyme/pyme.version.html | 14 ++++-----
9 files changed, 82 insertions(+), 35 deletions(-)
```

commit 6973a69a317608a0d0661590d701f4e3f3a21b32

Author: belyi <devnull@localhost>

Date: Wed Apr 2 02:35:24 2008 +0000

Have a fix for Contents being put onto 'Function and Data Index' page.

```
pyme-web/doc/gpgme/Concept-Index.html | 2 +-
pyme-web/doc/gpgme/Function-and-Data-Index.html | 153 +-----
pyme-web/doc/gpgme/index.html | 154 ++++++-----
3 files changed, 155 insertions(+), 154 deletions(-)
```

commit 086315964cbc2abad1187f306dcb9c72ac3257f3

Author: belyi <devnull@localhost>

Date: Wed Apr 2 01:00:29 2008 +0000

Update GPGME documentation. It's for v1.1.6 now.

```
pyme-web/doc/gpgme/ASCII-Armor.html | 57 ++
pyme-web/doc/gpgme/Advanced-Key-Editing.html | 98 +++
pyme-web/doc/gpgme/Algorithms.html | 47 ++
pyme-web/doc/gpgme/Building-the-Source.html | 82 +++
.../doc/gpgme/Callback-Based-Data-Buffers.html | 148 +++++
pyme-web/doc/gpgme/Cancellation.html | 67 ++
pyme-web/doc/gpgme/Concept-Index.html | 186 ++++++
pyme-web/doc/gpgme/Context-Attributes.html | 52 ++
pyme-web/doc/gpgme/Contexts.html | 61 ++
pyme-web/doc/gpgme/Creating-Contexts.html | 49 ++
pyme-web/doc/gpgme/Creating-Data-Buffers.html | 47 ++
pyme-web/doc/gpgme/Creating-a-Signature.html | 143 +++++
pyme-web/doc/gpgme/Crypto-Engine.html | 79 +++
pyme-web/doc/gpgme/Crypto-Operations.html | 67 ++
.../doc/gpgme/Cryptographic-Message-Syntax.html | 42 ++
.../doc/gpgme/Data-Buffer-I_002fO-Operations.html | 104 +++++
pyme-web/doc/gpgme/Data-Buffer-Meta_002dData.html | 100 +++
pyme-web/doc/gpgme/Decrypt-and-Verify.html | 79 +++
pyme-web/doc/gpgme/Decrypt.html | 123 ++++
```

pyme-web/doc/gpgme/Deleting-Keys.html | 67 ++  
 pyme-web/doc/gpgme/Destroying-Contexts.html | 46 ++  
 pyme-web/doc/gpgme/Destroying-Data-Buffers.html | 70 +++  
 pyme-web/doc/gpgme/Encrypt.html | 45 ++  
 pyme-web/doc/gpgme/Encrypting-a-Plaintext.html | 147 +++++  
 pyme-web/doc/gpgme/Engine-Configuration.html | 65 ++  
 pyme-web/doc/gpgme/Engine-Information.html | 119 ++++  
 pyme-web/doc/gpgme/Engine-Version-Check.html | 48 ++  
 pyme-web/doc/gpgme/Error-Codes.html | 133 ++++  
 pyme-web/doc/gpgme/Error-Handling.html | 72 +++  
 pyme-web/doc/gpgme/Error-Sources.html | 89 +++  
 pyme-web/doc/gpgme/Error-Strings.html | 80 +++  
 pyme-web/doc/gpgme/Error-Values.html | 159 +++++  
 pyme-web/doc/gpgme/Exchanging-Data.html | 58 ++  
 pyme-web/doc/gpgme/Exporting-Keys.html | 101 +++  
 pyme-web/doc/gpgme/Features.html | 59 ++  
 pyme-web/doc/gpgme/File-Based-Data-Buffers.html | 74 +++  
 pyme-web/doc/gpgme/Function-and-Data-Index.html | 380 ++++++  
 pyme-web/doc/gpgme/Generating-Keys.html | 144 +++++  
 pyme-web/doc/gpgme/Getting-Started.html | 55 ++  
 pyme-web/doc/gpgme/Hash-Algorithms.html | 59 ++  
 pyme-web/doc/gpgme/Header.html | 53 ++  
 ../doc/gpgme/I\_002fO-Callback-Example-GDK.html | 85 +++  
 ../gpgme/I\_002fO-Callback-Example-GTK\_002b.html | 86 +++  
 ../doc/gpgme/I\_002fO-Callback-Example-Qt.html | 99 +++  
 pyme-web/doc/gpgme/I\_002fO-Callback-Example.html | 259 ++++++  
 pyme-web/doc/gpgme/I\_002fO-Callback-Interface.html | 142 +++++  
 pyme-web/doc/gpgme/Importing-Keys.html | 171 +++++  
 pyme-web/doc/gpgme/Included-Certificates.html | 70 +++  
 pyme-web/doc/gpgme/Information-About-Keys.html | 207 ++++++  
 ../doc/gpgme/Information-About-Trust-Items.html | 75 +++  
 pyme-web/doc/gpgme/Introduction.html | 53 ++  
 pyme-web/doc/gpgme/Key-Listing-Mode.html | 99 +++  
 pyme-web/doc/gpgme/Key-Management.html | 260 ++++++  
 pyme-web/doc/gpgme/Key-Signatures.html | 130 ++++  
 ../doc/gpgme/Largefile-Support-\_0028LFS\_0029.html | 110 ++++  
 pyme-web/doc/gpgme/Library-Copying.html | 542 ++++++  
 pyme-web/doc/gpgme/Library-Version-Check.html | 97 +++  
 pyme-web/doc/gpgme/Listing-Keys.html | 204 ++++++  
 pyme-web/doc/gpgme/Listing-Trust-Items.html | 88 +++  
 pyme-web/doc/gpgme/Locale.html | 69 +++  
 pyme-web/doc/gpgme/Manipulating-Data-Buffers.html | 45 ++  
 pyme-web/doc/gpgme/Manipulating-Keys.html | 63 ++  
 pyme-web/doc/gpgme/Manipulating-Trust-Items.html | 62 ++  
 pyme-web/doc/gpgme/Memory-Based-Data-Buffers.html | 107 ++++  
 pyme-web/doc/gpgme/Multi-Threading.html | 93 +++  
 pyme-web/doc/gpgme/OpenPGP.html | 44 ++  
 pyme-web/doc/gpgme/Overview.html | 57 ++

|  |            |
|--|------------|
| pyme-web/doc/gpgme/Passphrase-Callback.html        | 101 +++    |
| pyme-web/doc/gpgme/Preparation.html                | 54 ++      |
| pyme-web/doc/gpgme/Progress-Meter-Callback.html    | 80 +++     |
| pyme-web/doc/gpgme/Protocol-Selection.html         | 60 ++      |
| pyme-web/doc/gpgme/Protocols-and-Engines.html      | 82 +++     |
| pyme-web/doc/gpgme/Public-Key-Algorithms.html      | 74 +++     |
| .../doc/gpgme/Registering-I_002fO-Callbacks.html   | 81 +++     |
| pyme-web/doc/gpgme/Run-Control.html                | 53 ++      |
| pyme-web/doc/gpgme/Selecting-Signers.html          | 64 ++      |
| pyme-web/doc/gpgme/Sign.html                       | 50 ++      |
| pyme-web/doc/gpgme/Signal-Handling.html            | 61 ++      |
| pyme-web/doc/gpgme/Signature-Notation-Data.html    | 85 +++     |
| pyme-web/doc/gpgme/Text-Mode.html                  | 63 ++      |
| pyme-web/doc/gpgme/Trust-Item-Management.html      | 68 ++      |
| pyme-web/doc/gpgme/Using-Automake.html             | 74 +++     |
| pyme-web/doc/gpgme/Using-External-Event-Loops.html | 74 +++     |
| pyme-web/doc/gpgme/Using-Libtool.html              | 44 ++      |
| pyme-web/doc/gpgme/Verify.html                     | 492 ++++++ |
| pyme-web/doc/gpgme/Waiting-For-Completion.html     | 77 +++     |
| pyme-web/doc/gpgme/gpgme.html                      | 251 -----  |
| pyme-web/doc/gpgme/gpgme_1.html                    | 76 ---     |
| pyme-web/doc/gpgme/gpgme_10.html                   | 61 --      |
| pyme-web/doc/gpgme/gpgme_11.html                   | 130 ----   |
| pyme-web/doc/gpgme/gpgme_12.html                   | 82 ---     |
| pyme-web/doc/gpgme/gpgme_13.html                   | 130 ----   |
| pyme-web/doc/gpgme/gpgme_14.html                   | 108 ----   |
| pyme-web/doc/gpgme/gpgme_15.html                   | 69 ---     |
| pyme-web/doc/gpgme/gpgme_16.html                   | 169 -----  |
| pyme-web/doc/gpgme/gpgme_17.html                   | 63 --      |
| pyme-web/doc/gpgme/gpgme_18.html                   | 63 --      |
| pyme-web/doc/gpgme/gpgme_19.html                   | 66 --      |
| pyme-web/doc/gpgme/gpgme_2.html                    | 79 ---     |
| pyme-web/doc/gpgme/gpgme_20.html                   | 120 ----   |
| pyme-web/doc/gpgme/gpgme_21.html                   | 102 ---    |
| pyme-web/doc/gpgme/gpgme_22.html                   | 108 ----   |
| pyme-web/doc/gpgme/gpgme_23.html                   | 237 -----  |
| pyme-web/doc/gpgme/gpgme_24.html                   | 154 -----  |
| pyme-web/doc/gpgme/gpgme_25.html                   | 248 -----  |
| pyme-web/doc/gpgme/gpgme_26.html                   | 107 ----   |
| pyme-web/doc/gpgme/gpgme_27.html                   | 80 ---     |
| pyme-web/doc/gpgme/gpgme_28.html                   | 67 --      |
| pyme-web/doc/gpgme/gpgme_29.html                   | 164 -----  |
| pyme-web/doc/gpgme/gpgme_3.html                    | 86 ---     |
| pyme-web/doc/gpgme/gpgme_30.html                   | 106 ----   |
| pyme-web/doc/gpgme/gpgme_31.html                   | 232 -----  |
| pyme-web/doc/gpgme/gpgme_32.html                   | 85 ---     |
| pyme-web/doc/gpgme/gpgme_33.html                   | 223 -----  |
| pyme-web/doc/gpgme/gpgme_34.html                   | 83 ---     |

|                                  |           |
|----------------------------------|-----------|
| pyme-web/doc/gpgme/gpgme_35.html | 70 ---    |
| pyme-web/doc/gpgme/gpgme_36.html | 63 --     |
| pyme-web/doc/gpgme/gpgme_37.html | 66 --     |
| pyme-web/doc/gpgme/gpgme_38.html | 86 ---    |
| pyme-web/doc/gpgme/gpgme_39.html | 79 ---    |
| pyme-web/doc/gpgme/gpgme_4.html  | 83 ---    |
| pyme-web/doc/gpgme/gpgme_40.html | 89 ---    |
| pyme-web/doc/gpgme/gpgme_41.html | 99 ---    |
| pyme-web/doc/gpgme/gpgme_42.html | 144 ----  |
| pyme-web/doc/gpgme/gpgme_43.html | 152 ----  |
| pyme-web/doc/gpgme/gpgme_44.html | 112 ----  |
| pyme-web/doc/gpgme/gpgme_45.html | 101 ---   |
| pyme-web/doc/gpgme/gpgme_46.html | 459 ----- |
| pyme-web/doc/gpgme/gpgme_47.html | 292 ----- |
| pyme-web/doc/gpgme/gpgme_48.html | 363 ----- |
| pyme-web/doc/gpgme/gpgme_49.html | 209 ----- |
| pyme-web/doc/gpgme/gpgme_5.html  | 74 ---    |
| pyme-web/doc/gpgme/gpgme_50.html | 88 ---    |
| pyme-web/doc/gpgme/gpgme_51.html | 208 ----- |
| pyme-web/doc/gpgme/gpgme_52.html | 154 ----  |
| pyme-web/doc/gpgme/gpgme_53.html | 291 ----- |
| pyme-web/doc/gpgme/gpgme_54.html | 91 ---    |
| pyme-web/doc/gpgme/gpgme_55.html | 107 ----  |
| pyme-web/doc/gpgme/gpgme_56.html | 140 ----  |
| pyme-web/doc/gpgme/gpgme_57.html | 106 ----  |
| pyme-web/doc/gpgme/gpgme_58.html | 89 ---    |
| pyme-web/doc/gpgme/gpgme_59.html | 97 ---    |
| pyme-web/doc/gpgme/gpgme_6.html  | 77 ---    |
| pyme-web/doc/gpgme/gpgme_60.html | 142 ----  |
| pyme-web/doc/gpgme/gpgme_61.html | 626 ----- |
| pyme-web/doc/gpgme/gpgme_62.html | 107 ----  |
| pyme-web/doc/gpgme/gpgme_63.html | 67 --     |
| pyme-web/doc/gpgme/gpgme_64.html | 95 ---    |
| pyme-web/doc/gpgme/gpgme_65.html | 233 ----- |
| pyme-web/doc/gpgme/gpgme_66.html | 65 --     |
| pyme-web/doc/gpgme/gpgme_67.html | 220 ----- |
| pyme-web/doc/gpgme/gpgme_68.html | 75 ---    |
| pyme-web/doc/gpgme/gpgme_69.html | 119 ----  |
| pyme-web/doc/gpgme/gpgme_7.html  | 123 ----  |
| pyme-web/doc/gpgme/gpgme_70.html | 107 ----  |
| pyme-web/doc/gpgme/gpgme_71.html | 218 ----- |
| pyme-web/doc/gpgme/gpgme_72.html | 134 ----  |
| pyme-web/doc/gpgme/gpgme_73.html | 299 ----- |
| pyme-web/doc/gpgme/gpgme_74.html | 103 ----  |
| pyme-web/doc/gpgme/gpgme_75.html | 104 ----  |
| pyme-web/doc/gpgme/gpgme_76.html | 118 ----  |
| pyme-web/doc/gpgme/gpgme_77.html | 95 ---    |
| pyme-web/doc/gpgme/gpgme_78.html | 71 ---    |

```

pyme-web/doc/gpgme/gpgme_79.html      | 686 -----
pyme-web/doc/gpgme/gpgme_8.html       | 155 ----
pyme-web/doc/gpgme/gpgme_80.html      | 120 ----
pyme-web/doc/gpgme/gpgme_81.html      | 278 -----
pyme-web/doc/gpgme/gpgme_82.html      | 272 -----
pyme-web/doc/gpgme/gpgme_83.html      | 180 -----
pyme-web/doc/gpgme/gpgme_84.html      | 99 ---
pyme-web/doc/gpgme/gpgme_9.html       | 104 ----
pyme-web/doc/gpgme/gpgme_abt.html     | 206 -----
pyme-web/doc/gpgme/gpgme_fot.html     | 53 --
pyme-web/doc/gpgme/gpgme_ovr.html     | 68 --
pyme-web/doc/gpgme/gpgme_toc.html     | 247 -----
pyme-web/doc/gpgme/index.html         | 497 ++++++-----
176 files changed, 9054 insertions(+), 13378 deletions(-)

```

```

commit 163c1053dc761682f5a4231da163bdd0ff7162d7
Author: belyi <devnull@localhost>
Date: Tue Apr 1 21:14:29 2008 +0000

```

Update Home page to be a bit more visitor friendly.

```

pyme-web/Makefile | 2 +-
pyme-web/default.css | 27 ++++++
pyme-web/index.html | 70 ++++++-----
3 files changed, 75 insertions(+), 24 deletions(-)

```

```

commit 05db2d17d8fda0ab8c948bbdc0643dfc1466830d
Author: belyi <devnull@localhost>
Date: Sun Mar 30 21:27:38 2008 +0000

```

Add a rule to build binary distribution for Windows.

```

pyme/Makefile | 16 ++++++
1 file changed, 14 insertions(+), 2 deletions(-)

```

```

commit 57acb1089f5f8c24323ee62fc0a7f492a496b9c0
Author: belyi <devnull@localhost>
Date: Sat Mar 29 22:50:11 2008 +0000

```

Switch to using central location for python files (pycentral)  
Update docs rule to fix location of the python source files.

```

pyme/Makefile | 5 +++-
pyme/debian/changelog | 4 +-
pyme/debian/control | 74 +++++-----
pyme/debian/dirs | 2 --
pyme/debian/docs | 1 +
pyme/debian/postinst.ex | 48 -----

```

```
pyme/debian/postrm.ex | 38 -----
pyme/debian/preinst.ex | 44 -----
pyme/debian/prerm.ex | 39 -----
pyme/debian/rules | 50 ++++++-----
pyme/debian/setup.cfg-2.2 | 8 ----
pyme/debian/setup.cfg-2.3 | 8 ----
pyme/debian/setup.cfg-2.4 | 8 ----
pyme/gpgme-h-clean.py | 2 +-
pyme/pyme/core.py | 2 +-
pyme/pyme/util.py | 2 +-
16 files changed, 28 insertions(+), 307 deletions(-)
```

commit 2b56fd10517cfbcffaa4ba98d8ea42f40f0d38a9

Author: belyi <devnull@localhost>

Date: Sun Mar 23 02:01:12 2008 +0000

Turn SWIG's autodoc feature on. Ignore 'next' in the types which are lists now.  
Use new style for class declarations. Specify None as a default value for  
core.check\_version() method. Update version.py for 0.8.0 version.

```
pyme/examples/pygpa.py | 2 +-
pyme/gpgme.i | 5 +++++
pyme/pyme/core.py | 2 +-
pyme/pyme/util.py | 5 +++--
pyme/pyme/version.py | 6 +++--
5 files changed, 13 insertions(+), 7 deletions(-)
```

commit df5e25d7ee4dc0aa0d429f9d009322dd8ac33bb8

Author: belyi <devnull@localhost>

Date: Thu Mar 20 19:07:00 2008 +0000

Improve matching for DEPRECATED typedefs

```
pyme/gpgme-h-clean.py | 4 +++-
1 file changed, 2 insertions(+), 2 deletions(-)
```

commit 78d8fc732848ac267ec65e9069265cd500587cdf

Author: belyi <devnull@localhost>

Date: Wed Mar 19 19:28:40 2008 +0000

Update API to use list when types containing 'next' field are return.  
Update examples accordingly  
Add verifydetails.py example  
Start adding bullets for 0.8.0 version.

```
pyme/Makefile | 2 +-
pyme/debian/changelog | 14 ++++++-
pyme/examples/PyGtkGpgKeys.py | 53 ++++++-----
```

```
pyme/examples/delkey.py      | 7 +++-
pyme/examples/encrypt-to-all.py | 7 +++-
pyme/examples/exportimport.py | 7 +++-
pyme/examples/pygpa.py      | 70 ++++++-----
pyme/examples/signverify.py | 11 +++-
pyme/examples/verifydetails.py | 79 ++++++
pyme/gpgme.i                | 19 ++++++-
10 files changed, 180 insertions(+), 89 deletions(-)
```

commit 342d85b07475e7360bcd62804bf5facda039494f

Author: belyi <devnull@localhost>

Date: Mon Mar 10 01:14:16 2008 +0000

Change references to source files so that they point to the WebCVS browse location.

```
pyme-web/doc/pyme/index.html      | 2 +-
pyme-web/doc/pyme/pyme.callbacks.html | 2 +-
pyme-web/doc/pyme/pyme.constants.data.encoding.html | 2 +-
pyme-web/doc/pyme/pyme.constants.data.html | 2 +-
pyme-web/doc/pyme/pyme.constants.event.html | 2 +-
pyme-web/doc/pyme/pyme.constants.html | 2 +-
pyme-web/doc/pyme/pyme.constants.import.html | 2 +-
pyme-web/doc/pyme/pyme.constants.keylist.html | 2 +-
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 2 +-
pyme-web/doc/pyme/pyme.constants.md.html | 2 +-
pyme-web/doc/pyme/pyme.constants.pk.html | 2 +-
pyme-web/doc/pyme/pyme.constants.protocol.html | 2 +-
pyme-web/doc/pyme/pyme.constants.sig.html | 2 +-
pyme-web/doc/pyme/pyme.constants.sig.mode.html | 2 +-
pyme-web/doc/pyme/pyme.constants.sigsum.html | 2 +-
pyme-web/doc/pyme/pyme.constants.status.html | 2 +-
pyme-web/doc/pyme/pyme.constants.validity.html | 2 +-
pyme-web/doc/pyme/pyme.core.html | 2 +-
pyme-web/doc/pyme/pyme.errors.html | 2 +-
pyme-web/doc/pyme/pyme.html | 2 +-
pyme-web/doc/pyme/pyme.util.html | 2 +-
pyme-web/doc/pyme/pyme.version.html | 2 +-
22 files changed, 22 insertions(+), 22 deletions(-)
```

commit 4139dd1d066c1a6c892d84fe45dc3e6c4aa1b803

Author: belyi <devnull@localhost>

Date: Sat Mar 8 18:21:08 2008 +0000

Add core.check\_version(None) to all examples since this function is used by Gpgme to do internal initialization. Update debian/rules to use dh\_pysupport instead of deprecated dh\_python.

```
pyme/debian/rules          | 8 +++-----
pyme/examples/PyGtkGpgKeys.py | 7 ++++++
pyme/examples/delkey.py    | 2 ++
pyme/examples/encrypt-to-all.py | 3 +++
pyme/examples/exportimport.py | 2 ++
pyme/examples/genkey.py    | 1 +
pyme/examples/inter-edit.py | 3 +++
pyme/examples/pygpa.py     | 5 ++++++
pyme/examples/sign.py      | 2 ++
pyme/examples/signverify.py | 2 ++
pyme/examples/simple.py    | 2 ++
pyme/examples/t-edit.py    | 3 +++
12 files changed, 34 insertions(+), 6 deletions(-)
```

commit ae76c6176457dd38e0634cbc17d794294a3a81d2

Author: belyi <devnull@localhost>

Date: Wed Apr 12 22:20:38 2006 +0000

Change name of internal package name from 'gpgme' to 'pygpgme' to avoid conflict with gpgme.dll on Windows.

Fix build with SWIG 1.3.28.

Change version to 0.7.1 in a preparation for new release.

```
pyme/Makefile             | 3 +-
pyme/debian/changelog     | 12 +++++
pyme/gpgme.i              | 19 +++---
pyme/pyme/callbacks.py    | 1 -
pyme/pyme/core.py         | 153 ++++++-----
pyme/pyme/errors.py       | 12 +++-
pyme/pyme/util.py         | 10 +++-
pyme/pyme/version.py      | 2 +-
pyme/setup.py             | 4 +-
9 files changed, 116 insertions(+), 100 deletions(-)
```

commit d644383a76e9f83bc2d426628319e3c4a989dc2d

Author: belyi <devnull@localhost>

Date: Sat Dec 17 01:34:53 2005 +0000

Put all constants into pyme.constants package to avoid stepping on python reserved words.

Add build rules for Mingw32 and Cygwin on Windows. Rules for Mingw under Debian are still to come.

Fixed a small bug in pygpa.py example.

```
pyme/Makefile             | 11 ++++++-----
pyme/examples/pygpa.py    | 3 +-
pyme/pyme/__init__.py     | 2 +-
pyme/pyme/constants/__init__.py | 3 +++
```

pyme/setup.py | 42 ++++++-----  
5 files changed, 51 insertions(+), 10 deletions(-)

commit 89eb370fcaa8adc9d219eadbaa579dde7bf06329

Author: belyi <devnull@localhost>

Date: Mon Aug 1 03:08:32 2005 +0000

Imported changes provided by Joost van Baal:

Use dh\_python in debian/rules and change the Section pyme belongs to from  
'libs' to 'python'.

pyme/debian/control | 6 +++---

pyme/debian/rules | 2 ++

2 files changed, 5 insertions(+), 3 deletions(-)

commit ad76d10c2a77b45b7459c62131279e946b860891

Author: belyi <devnull@localhost>

Date: Fri Jun 10 03:01:22 2005 +0000

Update 'docs' rule in Makefile to build packages first to ensure that  
documentation is build for the current version of pyme and not for the  
installed one.

Added 'callbacks' into the list of visible pyme modules (\_\_all\_\_ var.)

Slightly updated INSTALL file.

pyme/INSTALL | 11 ++++++-----

pyme/Makefile | 4 +++-

pyme/pyme/\_\_init\_\_.py | 2 +-

3 files changed, 11 insertions(+), 6 deletions(-)

commit 2fe1a81e00721698bfa6850b3db2eb85e43d1724

Author: belyi <devnull@localhost>

Date: Wed Jun 8 16:16:18 2005 +0000

Update pyme documentation to remove dead links to pyme.gpgme.html and  
pyme.\_gpgme.html

Added reference to the installed GPGME and PyMe documentation to the head  
web page.

Updated Makefile to install all \*.html files and to clean \*~ files in all  
subdirectories

pyme-web/Makefile | 10 ++++++-----

pyme-web/doc/pyme/index.html | 8 +++-----

pyme-web/doc/pyme/pyme.callbacks.html | 8 -----

pyme-web/doc/pyme/pyme.core.html | 1 -

pyme-web/doc/pyme/pyme.errors.html | 8 -----

pyme-web/doc/pyme/pyme.html | 8 +++-----  
pyme-web/doc/pyme/pyme.util.html | 8 -----  
pyme-web/index.html | 9 ++++++---  
8 files changed, 19 insertions(+), 41 deletions(-)

commit 6aa34cce4ea0099e50b4936dfce59778157b8ca8

Author: belyi <devnull@localhost>

Date: Wed Jun 8 15:18:20 2005 +0000

Added pyme and gpgme documentation.

pyme-web/doc/gpgme/gpgme.html | 251 ++++++++  
pyme-web/doc/gpgme/gpgme\_1.html | 76 +++  
pyme-web/doc/gpgme/gpgme\_10.html | 61 ++  
pyme-web/doc/gpgme/gpgme\_11.html | 130 ++++  
pyme-web/doc/gpgme/gpgme\_12.html | 82 +++  
pyme-web/doc/gpgme/gpgme\_13.html | 130 ++++  
pyme-web/doc/gpgme/gpgme\_14.html | 108 ++++  
pyme-web/doc/gpgme/gpgme\_15.html | 69 +++  
pyme-web/doc/gpgme/gpgme\_16.html | 169 ++++++  
pyme-web/doc/gpgme/gpgme\_17.html | 63 ++  
pyme-web/doc/gpgme/gpgme\_18.html | 63 ++  
pyme-web/doc/gpgme/gpgme\_19.html | 66 ++  
pyme-web/doc/gpgme/gpgme\_2.html | 79 +++  
pyme-web/doc/gpgme/gpgme\_20.html | 120 ++++  
pyme-web/doc/gpgme/gpgme\_21.html | 102 +++  
pyme-web/doc/gpgme/gpgme\_22.html | 108 ++++  
pyme-web/doc/gpgme/gpgme\_23.html | 237 ++++++++  
pyme-web/doc/gpgme/gpgme\_24.html | 154 ++++++  
pyme-web/doc/gpgme/gpgme\_25.html | 248 ++++++++  
pyme-web/doc/gpgme/gpgme\_26.html | 107 ++++  
pyme-web/doc/gpgme/gpgme\_27.html | 80 +++  
pyme-web/doc/gpgme/gpgme\_28.html | 67 ++  
pyme-web/doc/gpgme/gpgme\_29.html | 164 ++++++  
pyme-web/doc/gpgme/gpgme\_3.html | 86 +++  
pyme-web/doc/gpgme/gpgme\_30.html | 106 ++++  
pyme-web/doc/gpgme/gpgme\_31.html | 232 ++++++++  
pyme-web/doc/gpgme/gpgme\_32.html | 85 +++  
pyme-web/doc/gpgme/gpgme\_33.html | 223 ++++++++  
pyme-web/doc/gpgme/gpgme\_34.html | 83 +++  
pyme-web/doc/gpgme/gpgme\_35.html | 70 +++  
pyme-web/doc/gpgme/gpgme\_36.html | 63 ++  
pyme-web/doc/gpgme/gpgme\_37.html | 66 ++  
pyme-web/doc/gpgme/gpgme\_38.html | 86 +++  
pyme-web/doc/gpgme/gpgme\_39.html | 79 +++  
pyme-web/doc/gpgme/gpgme\_4.html | 83 +++  
pyme-web/doc/gpgme/gpgme\_40.html | 89 +++  
pyme-web/doc/gpgme/gpgme\_41.html | 99 +++

|                                  |            |
|----------------------------------|------------|
| pyme-web/doc/gpgme/gpgme_42.html | 144 +++++  |
| pyme-web/doc/gpgme/gpgme_43.html | 152 +++++  |
| pyme-web/doc/gpgme/gpgme_44.html | 112 +++++  |
| pyme-web/doc/gpgme/gpgme_45.html | 101 +++    |
| pyme-web/doc/gpgme/gpgme_46.html | 459 ++++++ |
| pyme-web/doc/gpgme/gpgme_47.html | 292 +++++  |
| pyme-web/doc/gpgme/gpgme_48.html | 363 +++++  |
| pyme-web/doc/gpgme/gpgme_49.html | 209 +++++  |
| pyme-web/doc/gpgme/gpgme_5.html  | 74 +++     |
| pyme-web/doc/gpgme/gpgme_50.html | 88 +++     |
| pyme-web/doc/gpgme/gpgme_51.html | 208 +++++  |
| pyme-web/doc/gpgme/gpgme_52.html | 154 +++++  |
| pyme-web/doc/gpgme/gpgme_53.html | 291 +++++  |
| pyme-web/doc/gpgme/gpgme_54.html | 91 +++     |
| pyme-web/doc/gpgme/gpgme_55.html | 107 +++++  |
| pyme-web/doc/gpgme/gpgme_56.html | 140 +++++  |
| pyme-web/doc/gpgme/gpgme_57.html | 106 +++++  |
| pyme-web/doc/gpgme/gpgme_58.html | 89 +++     |
| pyme-web/doc/gpgme/gpgme_59.html | 97 +++     |
| pyme-web/doc/gpgme/gpgme_6.html  | 77 +++     |
| pyme-web/doc/gpgme/gpgme_60.html | 142 +++++  |
| pyme-web/doc/gpgme/gpgme_61.html | 626 ++++++ |
| pyme-web/doc/gpgme/gpgme_62.html | 107 +++++  |
| pyme-web/doc/gpgme/gpgme_63.html | 67 ++      |
| pyme-web/doc/gpgme/gpgme_64.html | 95 +++     |
| pyme-web/doc/gpgme/gpgme_65.html | 233 +++++  |
| pyme-web/doc/gpgme/gpgme_66.html | 65 ++      |
| pyme-web/doc/gpgme/gpgme_67.html | 220 +++++  |
| pyme-web/doc/gpgme/gpgme_68.html | 75 +++     |
| pyme-web/doc/gpgme/gpgme_69.html | 119 +++++  |
| pyme-web/doc/gpgme/gpgme_7.html  | 123 +++++  |
| pyme-web/doc/gpgme/gpgme_70.html | 107 +++++  |
| pyme-web/doc/gpgme/gpgme_71.html | 218 +++++  |
| pyme-web/doc/gpgme/gpgme_72.html | 134 +++++  |
| pyme-web/doc/gpgme/gpgme_73.html | 299 +++++  |
| pyme-web/doc/gpgme/gpgme_74.html | 103 +++++  |
| pyme-web/doc/gpgme/gpgme_75.html | 104 +++++  |
| pyme-web/doc/gpgme/gpgme_76.html | 118 +++++  |
| pyme-web/doc/gpgme/gpgme_77.html | 95 +++     |
| pyme-web/doc/gpgme/gpgme_78.html | 71 +++     |
| pyme-web/doc/gpgme/gpgme_79.html | 686 ++++++ |
| pyme-web/doc/gpgme/gpgme_8.html  | 155 +++++  |
| pyme-web/doc/gpgme/gpgme_80.html | 120 +++++  |
| pyme-web/doc/gpgme/gpgme_81.html | 278 +++++  |
| pyme-web/doc/gpgme/gpgme_82.html | 272 +++++  |
| pyme-web/doc/gpgme/gpgme_83.html | 180 +++++  |
| pyme-web/doc/gpgme/gpgme_84.html | 99 +++     |
| pyme-web/doc/gpgme/gpgme_9.html  | 104 +++++  |

```

pyme-web/doc/gpgme/gpgme_abt.html      | 206 ++++++
pyme-web/doc/gpgme/gpgme_fot.html      | 53 ++
pyme-web/doc/gpgme/gpgme_ovr.html      | 68 ++
pyme-web/doc/gpgme/gpgme_toc.html      | 247 ++++++
pyme-web/doc/gpgme/index.html          | 251 ++++++
pyme-web/doc/pyme/index.html           | 166 +++++
pyme-web/doc/pyme/pyme.callbacks.html   | 50 ++
.../doc/pyme/pyme.constants.data.encoding.html | 48 ++
pyme-web/doc/pyme/pyme.constants.data.html | 29 +
pyme-web/doc/pyme/pyme.constants.event.html | 48 ++
pyme-web/doc/pyme/pyme.constants.html   | 39 ++
pyme-web/doc/pyme/pyme.constants.import.html | 49 ++
pyme-web/doc/pyme/pyme.constants.keylist.html | 29 +
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 48 ++
pyme-web/doc/pyme/pyme.constants.md.html | 58 ++
pyme-web/doc/pyme/pyme.constants.pk.html | 50 ++
pyme-web/doc/pyme/pyme.constants.protocol.html | 46 ++
pyme-web/doc/pyme/pyme.constants.sig.html | 29 +
pyme-web/doc/pyme/pyme.constants.sig.mode.html | 47 ++
pyme-web/doc/pyme/pyme.constants.sigsum.html | 55 ++
pyme-web/doc/pyme/pyme.constants.status.html | 117 ++++
pyme-web/doc/pyme/pyme.constants.validity.html | 50 ++
pyme-web/doc/pyme/pyme.core.html       | 254 ++++++
pyme-web/doc/pyme/pyme.errors.html      | 90 +++
pyme-web/doc/pyme/pyme.html            | 166 +++++
pyme-web/doc/pyme/pyme.util.html        | 78 +++
pyme-web/doc/pyme/pyme.version.html     | 37 ++
pyme-web/index.html                    | 6 +-
113 files changed, 14966 insertions(+), 1 deletion(-)

```

commit 2d6fe54479f042644f7b0f3d2fe35877d2056144

Author: belyi <devnull@localhost>

Date: Thu May 19 02:06:09 2005 +0000

Added INSTALL file.

```
pyme/INSTALL | 10 ++++++
```

1 file changed, 10 insertions(+)

commit d6892fff0c3cedf41dba4c25ab8608e7f2bc039c

Author: belyi <devnull@localhost>

Date: Tue May 17 16:49:28 2005 +0000

Update copyright note on simple.py

```
pyme/examples/simple.py | 4 ++--
```

1 file changed, 2 insertions(+), 2 deletions(-)

commit c2cd9cdf5995843aad7b200b929db2969effc9d2

Author: belyi <devnull@localhost>

Date: Tue May 17 15:03:58 2005 +0000

Update simple.py to catch errors.

pyme/examples/simple.py | 17 ++++++++-----

1 file changed, 11 insertions(+), 6 deletions(-)

commit eaedae7c6a0ea993caab067efe781a59b6769c44

Author: belyi <devnull@localhost>

Date: Tue May 17 01:18:23 2005 +0000

Added 'PYTHON = python' into Makefile for bug #1199122

pyme/Makefile | 1 +

pyme/examples/signverify.py | 1 +

2 files changed, 2 insertions(+)

commit 56fd244bb2636a4d58629899ea3cde1d96428198

Author: belyi <devnull@localhost>

Date: Wed Apr 27 21:37:06 2005 +0000

Added pygpa example.

pyme/debian/changelog | 3 +-

pyme/examples/pygpa.glade | 5546 ++++++

pyme/examples/pygpa.py | 1459 ++++++

3 files changed, 7007 insertions(+), 1 deletion(-)

commit 2d9a2a91a59ac3fee5410c953b7e0859e9e7cd35

Author: belyi <devnull@localhost>

Date: Thu Apr 21 15:17:51 2005 +0000

Change version to 0.7.0 due to the change in license.

pyme/debian/changelog | 2 +-

pyme/pyme/version.py | 2 +-

2 files changed, 2 insertions(+), 2 deletions(-)

commit 94e34e38d742f145385bd235825b6ba1e30d8339

Author: belyi <devnull@localhost>

Date: Thu Apr 21 03:53:12 2005 +0000

Changed license on PyMe from GPL to LGPL.

PyMe examples keep GPL license.

pyme/COPYING.LESSER | 510 ++++++

```
pyme/Makefile | 20 +-
pyme/debian/changelog | 4 +-
pyme/debian/copyright | 22 +-
pyme/gpgme-h-clean.py | 16 ++
pyme/gpgme.i | 20 +-
pyme/helpers.c | 20 +-
pyme/helpers.h | 20 +-
pyme/pyme/__init__.py | 20 +-
pyme/pyme/callbacks.py | 20 +-
pyme/pyme/constants/data/encoding.py | 20 +-
pyme/pyme/constants/event.py | 20 +-
pyme/pyme/constants/import.py | 20 +-
pyme/pyme/constants/keylist/mode.py | 20 +-
pyme/pyme/constants/md.py | 20 +-
pyme/pyme/constants/pk.py | 20 +-
pyme/pyme/constants/protocol.py | 20 +-
pyme/pyme/constants/sig/mode.py | 20 +-
pyme/pyme/constants/sigsum.py | 20 +-
pyme/pyme/constants/status.py | 20 +-
pyme/pyme/constants/validity.py | 20 +-
pyme/pyme/core.py | 20 +-
pyme/pyme/errors.py | 20 +-
pyme/pyme/util.py | 20 +-
pyme/pyme/version.py | 22 +-
pyme/setup.py | 20 +-
26 files changed, 761 insertions(+), 233 deletions(-)
```

commit 0d8aa0f6335cb1506a37085095ed45173b099a02

Author: belyi <devnull@localhost>

Date: Tue Apr 19 01:46:06 2005 +0000

Added `__hash__` and `__eq__` methods to `GpgmeWrapper` to allow both `Context()` and `Data()` to be used as a dictionary key.

Changed `core.wait()` function to always return a tuple. On timeout now it returns `(0, None)` instead of just `None`. Plus, return context is now a `Context()` object instead of a wrapper return by underlying `gpgme`.

```
pyme/helpers.c | 1 -
pyme/pyme/core.py | 25 ++++++-----
pyme/pyme/util.py | 9 ++++++
3 files changed, 24 insertions(+), 11 deletions(-)
```

commit 63ff6d10637be1dcbcd78c939ac1ef1ac30b1024

Author: belyi <devnull@localhost>

Date: Wed Apr 6 04:58:40 2005 +0000

Made hook parameter optional in `passphrase_cb` and `progress_cb`.

Allowed `None` for callbacks to unset ones set previously.

Removed cleanup of exception in callbacks - now just retrieve the error code.  
Added prev\_bad parameter in passphrase\_cb since it can be used in  
change password protocols.  
Updated examples to follow new sets of arguments in callbacks  
Updated op\_edit to check if passed key is None (otherwise gpgme dumps core)  
God rid of annoying warning "function declaration isn't a prototype" in  
helpers.c and helpers.h by changing from () to (void) list of arguments.

```
pyme/debian/changelog | 10 +++++---  
pyme/examples/signverify.py | 2 +-  
pyme/examples/t-edit.py | 2 +-  
pyme/gpgme.i | 18 ++++++-----  
pyme/helpers.c | 60 ++++++-----  
pyme/helpers.h | 4 +--  
pyme/pyme/callbacks.py | 6 +++--  
pyme/pyme/core.py | 47 ++++++-----  
pyme/pyme/errors.py | 2 +-  
9 files changed, 96 insertions(+), 55 deletions(-)
```

commit 8f0ab8138c7aa190936376ccbbf33bb09c64d6f1

Author: belyi <devnull@localhost>

Date: Thu Mar 31 23:50:59 2005 +0000

Added exception handling in passphrase\_cb and edit\_cb. If GPGMEEError  
exception is thrown in those callbacks it will be converted into its  
core representation and return as an error code to the caller.  
On all other exceptions error code will be GPG\_ERR\_GENERAL.

```
pyme/Makefile | 1 +  
pyme/debian/changelog | 8 ++++++  
pyme/gpgme.i | 20 ++++++-----  
pyme/helpers.c | 51 ++++++-----  
pyme/helpers.h | 3 +++  
5 files changed, 71 insertions(+), 12 deletions(-)
```

commit 9903d1fb11231e7e3d920e58d1ecb674c5988b07

Author: belyi <devnull@localhost>

Date: Thu Mar 31 05:12:15 2005 +0000

Remove workaround from Context.wait() method since the bug report and  
patch fixing gpgme\_wait's behavior is sent to GPMGE developers already.  
Added errorcheck into op\_edit() so that it can report an error.

```
pyme/pyme/core.py | 10 +++++-----  
1 file changed, 5 insertions(+), 5 deletions(-)
```

commit 45e8a5f4e13d3ca797ec3b0037242874a6be5562

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:44:18 2005 +0000

Updated version number to 0.6.2 in version.py  
Added examples/\*.glade files into documentation package.

pyme/debian/examples | 1 +  
pyme/pyme/version.py | 2 +-  
2 files changed, 2 insertions(+), 1 deletion(-)

commit 270b87bb40e180cb6e8f1de9a0e8161525ffa4ab

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:31:14 2005 +0000

Updated debian/changelog regarding PyGtkGpgKeys example and a fix in errors.

pyme/debian/changelog | 5 ++++-  
1 file changed, 4 insertions(+), 1 deletion(-)

commit ea4682009a506db91e5174ffd038fe7e4406b591

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:25:36 2005 +0000

Added handling of right mouse button click.  
Changed reporting a string instead of a number on key generation failure.

pyme/examples/PyGtkGpgKeys.glade | 2 ++  
pyme/examples/PyGtkGpgKeys.py | 30 ++++++-----  
2 files changed, 29 insertions(+), 3 deletions(-)

commit f65ad1a703d0098a3204fb8527a54d253e5847e7

Author: belyi <devnull@localhost>

Date: Sat Mar 26 18:11:11 2005 +0000

Added another column indicating if a key has a secret part.  
Automated generation of the View menu from the view field of the KeyColumn class.

pyme/examples/PyGtkGpgKeys.glade | 93 +-----  
pyme/examples/PyGtkGpgKeys.py | 74 +-----  
2 files changed, 44 insertions(+), 123 deletions(-)

commit b54e83a7a7a5785502f3c7e8b95f15e23b40e65a

Author: belyi <devnull@localhost>

Date: Sat Mar 26 16:45:13 2005 +0000

Small change to the way gtk.TreeModel object is used.

pyme/examples/PyGtkGpgKeys.py | 21 +-----

1 file changed, 10 insertions(+), 11 deletions(-)

commit 7078db75cef4c1fd70cf03e37172bdb4f933fd1b

Author: belyi <devnull@localhost>

Date: Fri Mar 25 23:33:06 2005 +0000

Use more comprehensible error reporting since `gpgme_strerror_r` returns None all the time.

pyme/pyme/errors.py | 6 +++---

1 file changed, 3 insertions(+), 3 deletions(-)

commit 151213f4344d9984975721440af07de09e3df61c

Author: belyi <devnull@localhost>

Date: Fri Mar 25 04:30:17 2005 +0000

Improved `PyGtkGpgKeys` example to manage `owner_trust` on keys.  
Added another example `inter-edit.py` which is just a helper to write scripts for `Context.op_edit()` command.

pyme/examples/PyGtkGpgKeys.glade | 78 ++++++

pyme/examples/PyGtkGpgKeys.py | 68 ++++++

pyme/examples/inter-edit.py | 54 ++++++

pyme/examples/t-edit.py | 18 ++++++

4 files changed, 212 insertions(+), 6 deletions(-)

commit fc7235af217bcee5231ce7fd7f234712d5ad3b0

Author: belyi <devnull@localhost>

Date: Fri Mar 25 00:30:39 2005 +0000

Updated `PyGtkGpgKeys` example to include import, export and reload functionality. Also added ability to remove number of keys simultaneously.  
Rearranged how `KeyColumn` is used to avoid unnecessary sorts and duplication of information in different parts of the code.

pyme/examples/PyGtkGpgKeys.glade | 86 ++++++

pyme/examples/PyGtkGpgKeys.py | 332 ++++++

2 files changed, 325 insertions(+), 93 deletions(-)

commit 9f65749ccb1b7cab562e19c03f4371d5f7d94912

Author: belyi <devnull@localhost>

Date: Thu Mar 24 05:51:03 2005 +0000

Added example of `PyGTK+` and `PyMe` integration.  
For now it does only simple things - listing, deleting, and generating keys.

pyme/examples/PyGtkGpgKeys.glade | 1321 ++++++

pyme/examples/PyGtkGpgKeys.gladep | 8 +

pyme/examples/PyGtkGpgKeys.py | 424 ++++++++  
3 files changed, 1753 insertions(+)

commit 59e23f32c3b46413c9ec09e23e1a385a110fb103

Author: belyi <devnull@localhost>

Date: Thu Mar 24 05:44:58 2005 +0000

Added wait method Context class which handles asynchronous calls a little bit better than the one generated by SWIG.

pyme/debian/changelog | 7 ++++++

pyme/gpgme.i | 1 +

pyme/pyme/core.py | 40 ++++++

3 files changed, 48 insertions(+)

commit 4c1b5259e4985df2cba0ae4fc09f12cd94603a75

Author: belyi <devnull@localhost>

Date: Tue Mar 22 18:29:31 2005 +0000

Added correct handling of Context.op\_edit() method.  
Added example/t-edit.py showing usage for this method.  
Output of this example should match output of the tests/gpg/t-edit from the GPGME test suite.  
Remove unused static function from helpers.c

pyme/examples/t-edit.py | 38 ++++++

pyme/gpgme.i | 36 ++++++

pyme/helpers.c | 36 -----

pyme/pyme/core.py | 5 ++++-

4 files changed, 78 insertions(+), 37 deletions(-)

commit dc587e215283bfef2dd594f86a7b2945f74f5155

Author: belyi <devnull@localhost>

Date: Sat Mar 19 01:43:59 2005 +0000

Update changelog to include note about deprecated function in 0.6.1 release

pyme/debian/changelog | 3 ++-

pyme/examples/encrypt-to-all.py | 3 +--

2 files changed, 3 insertions(+), 3 deletions(-)

commit 86de4b3ad777f980ccf7ba3462c85bbe1787d1fd

Author: belyi <devnull@localhost>

Date: Sat Mar 19 01:40:07 2005 +0000

Remove deprecated functions from helpers.[ch]  
Use gpgme-h-clean.py to remove deprecated functions and typedefs from the GPGME header file. This will reduce the number of unused methods.

```
pyme/Makefile      | 4 +++-
pyme/gpgme-h-clean.py | 26 ++++++
pyme/helpers.c     | 8 -----
pyme/helpers.h     | 2 --
4 files changed, 28 insertions(+), 12 deletions(-)
```

commit 2483efcbd0d73c628c4d7717928a766c3b58f0aa

Author: belyi <devnull@localhost>

Date: Fri Mar 18 22:15:52 2005 +0000

Update copyright and author values in pyme/version.py  
Create rules to build distribution files - one full and one without  
debian bits.

```
pyme/Makefile      | 28 ++++++
pyme/pyme/version.py | 12 +++++-
2 files changed, 28 insertions(+), 12 deletions(-)
```

commit 168593285380f5a7805f3dd08657d429a72d3621

Author: belyi <devnull@localhost>

Date: Fri Mar 18 19:09:33 2005 +0000

Added package building for python2.4

Updated copyright notes to include myself and avoid confusion who's the  
maintainer. In John's own words: "I'd prefer to just step out of the picture".  
Jonh's copyright notice left intact.

```
pyme/Makefile      | 6 +++-
pyme/debian/changelog | 7 ++++++
pyme/debian/control  | 30 ++++++
pyme/debian/copyright | 10 +++++-
pyme/debian/rules    | 4 ++++
pyme/debian/setup.cfg-2.4 | 8 ++++++
pyme/examples/genkey.py | 4 +++-
pyme/gpgme.i         | 4 +++-
pyme/helpers.c       | 4 +++-
pyme/helpers.h       | 4 +++-
pyme/pyme/__init__.py | 4 +++-
pyme/pyme/callbacks.py | 4 +++-
pyme/pyme/constants/data/encoding.py | 4 +++-
pyme/pyme/constants/event.py | 4 +++-
pyme/pyme/constants/import.py | 4 +++-
pyme/pyme/constants/keylist/mode.py | 4 +++-
pyme/pyme/constants/md.py | 4 +++-
pyme/pyme/constants/pk.py | 4 +++-
pyme/pyme/constants/protocol.py | 4 +++-
```

```
pyme/pyme/constants/sig/mode.py | 4 +++-
pyme/pyme/constants/sigsum.py | 4 +++-
pyme/pyme/constants/status.py | 4 +++-
pyme/pyme/constants/validity.py | 4 +++-
pyme/pyme/core.py | 4 +++-
pyme/pyme/errors.py | 4 +++-
pyme/pyme/util.py | 4 +++-
pyme/pyme/version.py | 2 +-
pyme/setup.py | 3 +-
28 files changed, 96 insertions(+), 54 deletions(-)
```

commit 6dbbb252771133724b2879ed6d767cd708196dae

Author: belyi <devnull@localhost>

Date: Fri Mar 18 18:04:35 2005 +0000

Remove the note about gpgme.i to be generated - it's been the primary source for some time.

```
pyme/gpgme.i | 6 -----
1 file changed, 6 deletions(-)
```

commit 9d449fa4889c6bda6d14583c0625b8d5c4ffe759

Author: belyi <devnull@localhost>

Date: Fri May 7 18:31:22 2004 +0000

Added my copyright in genkey.py since there's enough changes made.  
Updated signverify to use only keys generated by genkey.py, to check that keys added to singers are able to sign and to check that the list of signers is not empty. The last check is necessary to prevent signing with the key of the user running signverify.py script.  
Added delkey.py script to delete keys generated by genkey.py  
Added exportimport.py example for key export/import.

```
pyme/examples/delkey.py | 29 ++++++
pyme/examples/exportimport.py | 76 ++++++
pyme/examples/genkey.py | 6 +++-
pyme/examples/signverify.py | 18 ++++++
4 files changed, 119 insertions(+), 10 deletions(-)
```

commit df98c8d28245ad2c14b0ab50fc8f8932853bec8b

Author: belyi <devnull@localhost>

Date: Tue May 4 17:34:15 2004 +0000

Added examples/signverify.py for unattended sing/verify.  
Updated examples/genkey.py to work correctly.  
Updated gpgme.i to allow None as a value for gpgme\_data\_t

```
pyme/examples/genkey.py | 14 +++-----
```

pyme/examples/signverify.py | 72 ++++++

pyme/gpgme.i | 21 +++++-

3 files changed, 87 insertions(+), 20 deletions(-)

commit ba45931abf530ab89ead46d7233ff1b62b629a18

Author: belyi <devnull@localhost>

Date: Thu Apr 8 16:15:09 2004 +0000

Ensure that we support only python2.2 and up. :-)

Use generators in core.Context class which makes pyme.aux obsolete

Remove importing future nested\_scopes since they are standard starting with python2.2

pyme/pyme/\_\_init\_\_.py | 5 +----

pyme/pyme/aux.py | 56 -----

pyme/pyme/core.py | 15 ++++++

pyme/pyme/errors.py | 1 -

pyme/pyme/util.py | 2 +-

5 files changed, 15 insertions(+), 64 deletions(-)

commit 4e9be5a55ecffa4da7ad5c192cc892eddaaa9586

Author: belyi <devnull@localhost>

Date: Sun Mar 21 03:53:30 2004 +0000

Small change to index.html

Added clean: rule to the Makefile

pyme-web/Makefile | 3 +++

pyme-web/index.html | 6 +++--

2 files changed, 6 insertions(+), 3 deletions(-)

commit 2efb95176f4edf56ed61c9ac0c3aa09c56534df0

Author: belyi <devnull@localhost>

Date: Sun Mar 21 03:00:32 2004 +0000

Added Makefile rules for pyme module installation.

pyme/Makefile | 5 ++++-

1 file changed, 4 insertions(+), 1 deletion(-)

commit 2b83d5d8b513029cc3e54f2fa502ccc85618104b

Author: belyi <devnull@localhost>

Date: Sun Mar 21 02:29:54 2004 +0000

Decorative change.

pyme/pyme/aux.py | 2 +-

1 file changed, 1 insertion(+), 1 deletion(-)

commit e3478015d763a036c1d806ae01433fce59712204

Author: belyi <devnull@localhost>

Date: Sun Mar 21 02:25:55 2004 +0000

Added RCS Id: tags

```
pyme/Makefile          | 1 +
pyme/examples/encrypt-to-all.py | 3 +-
pyme/examples/genkey.py | 3 +-
pyme/examples/sign.py  | 3 +-
pyme/examples/simple.py | 3 +-
pyme/gpgme.i           | 1 +
pyme/helpers.c         | 1 +
pyme/helpers.h         | 1 +
pyme/pyme/__init__.py  | 1 +
pyme/pyme/aux.py       | 1 +
pyme/pyme/callbacks.py | 1 +
pyme/pyme/constants/__init__.py | 2 ++
pyme/pyme/constants/data/__init__.py | 2 ++
pyme/pyme/constants/data/encoding.py | 1 +
pyme/pyme/constants/event.py | 1 +
pyme/pyme/constants/import.py | 1 +
pyme/pyme/constants/keylist/__init__.py | 2 ++
pyme/pyme/constants/keylist/mode.py | 1 +
pyme/pyme/constants/md.py | 1 +
pyme/pyme/constants/pk.py | 1 +
pyme/pyme/constants/protocol.py | 1 +
pyme/pyme/constants/sig/__init__.py | 2 ++
pyme/pyme/constants/sig/mode.py | 1 +
pyme/pyme/constants/sigsum.py | 1 +
pyme/pyme/constants/status.py | 1 +
pyme/pyme/constants/validity.py | 1 +
pyme/pyme/core.py      | 1 +
pyme/pyme/errors.py    | 1 +
pyme/pyme/util.py      | 1 +
pyme/pyme/version.py   | 2 ++
30 files changed, 39 insertions(+), 4 deletions(-)
```

commit b3b3712645332c5bc3e8d9d557aab21d48ff0f86

Author: belyi <devnull@localhost>

Date: Sun Mar 21 02:07:36 2004 +0000

Added Id: RCS tags to all files.

```
pyme-web/Makefile | 2 ++
pyme-web/index.html | 3 +-
2 files changed, 4 insertions(+), 1 deletion(-)
```

commit 6aea2426beaaa8c43e6f2310a37a2737c0c3a1b5

Author: belyi <devnull@localhost>

Date: Sun Mar 21 01:50:55 2004 +0000

Update example on the init pyme.html page to match simple.py example.  
Fix core.py to use getcode() instead of getvalue() method of the exception.

pyme/pyme/\_\_init\_\_.py | 22 ++++++-----  
pyme/pyme/core.py | 4 +---  
2 files changed, 16 insertions(+), 10 deletions(-)

commit dee337455ffd624d3f83e1c159c4bb2cefc692c9

Author: belyi <devnull@localhost>

Date: Sat Mar 20 20:32:29 2004 +0000

Added Makefile to simplify publishing web files.

pyme-web/Makefile | 7 ++++++  
1 file changed, 7 insertions(+)

commit af7129baa8260697d85c2ddb434562e8a80b62d8

Author: belyi <devnull@localhost>

Date: Sat Mar 20 20:15:53 2004 +0000

Added minimum of formatting and SF icon.

pyme-web/index.html | 18 ++++++-----  
1 file changed, 11 insertions(+), 7 deletions(-)

commit 2e64dcbf99cee796b51667b04d8961e390edde87

Author: belyi <devnull@localhost>

Date: Sat Mar 20 18:30:09 2004 +0000

Initial revision

pyme-web/index.html | 33 ++++++-----  
1 file changed, 33 insertions(+)

commit 1c51644b3d0b6611422d971758e35f303d2ad5df

Author: belyi <devnull@localhost>

Date: Sat Mar 20 05:10:46 2004 +0000

Update examples and package information on the initial pyme doc page.

pyme/pyme/\_\_init\_\_.py | 27 ++++++-----  
1 file changed, 12 insertions(+), 15 deletions(-)

commit b2d31b0bfbffdf5247d6db4e3c95140cc1b1f19

Author: belyi <devnull@localhost>

Date: Sat Mar 20 04:47:42 2004 +0000

Deleted unnecessary files.

Updated debian/control to remove dependency on python-xml package since there's none now.

Move example files from 'doc' into separate control file.

Update debian/rules to build documentation from \*.py files and to exclude CVS directories from the installation.

```
pyme/Makefile          | 26 ++-----
pyme/debian/control    |  8 +--
pyme/debian/docs       |  1 -
pyme/debian/ex.package.doc-base | 22 -----
pyme/debian/examples   |  1 +
pyme/debian/manpage.1.ex | 60 -----
pyme/debian/manpage.sgml.ex | 152 -----
pyme/debian/rules      | 12 ++--
8 files changed, 15 insertions(+), 267 deletions(-)
```

commit 1b517dd9b82a433499b4696b06d94d756cd36e53

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:59:15 2004 +0000

Remove doc/gpgme directory containing GPGME documentation since this belongs to a different project. Need to add reference in our documentation.

```
pyme/doc/gpgme/fdl.texi | 402 -----
pyme/doc/gpgme/gpgme.texi | 3372 -----
pyme/doc/gpgme/gpl.texi | 397 -----
pyme/doc/gpgme/version.texi | 4 -
4 files changed, 4175 deletions(-)
```

commit 95d7d171da115a0fedfe2a4a7e5acc8aa408f673

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:45:03 2004 +0000

Change debian/rules to generate files by swig during build and to cleanup those files on 'clean' rule.

Plus, leave generated gpgme\_wrap.c in the root directory instead of moving it into subdirectory 'generated'.

```
pyme/Makefile | 8 +++-----
pyme/debian/rules | 3 ++-
pyme/setup.py | 2 +-
3 files changed, 6 insertions(+), 7 deletions(-)
```

commit 545b3d90d445c5c78e8d72b2c1780863e02c789a

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:18:01 2004 +0000

#### Initial revision

```
pyme/COPYING | 340 ++++
pyme/ChangeLog | 802 ++++++++
pyme/Makefile | 79 +
pyme/debian/README.Debian | 6 +
pyme/debian/changelog | 19 +
pyme/debian/control | 68 +
pyme/debian/copyright | 27 +
pyme/debian/dirs | 2 +
pyme/debian/docs | 2 +
pyme/debian/ex.package.doc-base | 22 +
pyme/debian/manpage.1.ex | 60 +
pyme/debian/manpage.sgml.ex | 152 ++
pyme/debian/postinst.ex | 48 +
pyme/debian/posrm.ex | 38 +
pyme/debian/preinst.ex | 44 +
pyme/debian/prerm.ex | 39 +
pyme/debian/rules | 130 ++
pyme/debian/setup.cfg-2.2 | 8 +
pyme/debian/setup.cfg-2.3 | 8 +
pyme/doc/gpgme/fdl.texi | 402 ++++
pyme/doc/gpgme/gpgme.texi | 3372 ++++++
pyme/doc/gpgme/gpl.texi | 397 ++++
pyme/doc/gpgme/version.texi | 4 +
pyme/examples/encrypt-to-all.py | 63 +
pyme/examples/genkey.py | 55 +
pyme/examples/sign.py | 28 +
pyme/examples/simple.py | 44 +
pyme/gpgme.i | 191 ++
pyme/helpers.c | 139 ++
pyme/helpers.h | 29 +
pyme/pyme/__init__.py | 134 ++
pyme/pyme/aux.py | 55 +
pyme/pyme/callbacks.py | 45 +
pyme/pyme/constants/__init__.py | 2 +
pyme/pyme/constants/data/__init__.py | 2 +
pyme/pyme/constants/data/encoding.py | 19 +
pyme/pyme/constants/event.py | 19 +
pyme/pyme/constants/import.py | 19 +
pyme/pyme/constants/keylist/__init__.py | 2 +
pyme/pyme/constants/keylist/mode.py | 19 +
pyme/pyme/constants/md.py | 19 +
pyme/pyme/constants/pk.py | 19 +
```

```
pyme/pyme/constants/protocol.py | 19 +
pyme/pyme/constants/sig/__init__.py | 2 +
pyme/pyme/constants/sig/mode.py | 19 +
pyme/pyme/constants/sigsum.py | 19 +
pyme/pyme/constants/status.py | 19 +
pyme/pyme/constants/validity.py | 19 +
pyme/pyme/core.py | 367 +++++
pyme/pyme/errors.py | 46 +
pyme/pyme/util.py | 61 +
pyme/pyme/version.py | 39 +
pyme/setup.py | 60 +
53 files changed, 7642 insertions(+)
```

commit a3d5a442dc713b6c4d6fc4134db5b47e379dc41d

Author: root <devnull@localhost>

Date: Fri Mar 19 14:12:30 2004 +0000

initial checkin

```
CVSROOT/checkoutlist | 13 ++++++
CVSROOT/commitinfo | 15 ++++++
CVSROOT/config | 21 ++++++
CVSROOT/cvswrappers | 19 ++++++
CVSROOT/editinfo | 21 ++++++
CVSROOT/loginfo | 26 ++++++
CVSROOT/modules | 26 ++++++
CVSROOT/notify | 12 ++++++
CVSROOT/rcsinfo | 13 ++++++
CVSROOT/taginfo | 20 ++++++
CVSROOT/verifymsg | 21 ++++++
11 files changed, 207 insertions(+)
```

```
\input texinfo @c -*- texinfo -*-
```

```
@c %**start of header
```

```
@setfilename short-history.info
```

```
@settitle A Short History of the GPGME bindings for Python
```

```
@documentencoding utf-8
```

```
@documentlanguage en
```

```
@c %**end of header
```

```
@finalout
```

```
@titlepage
```

```
@title A Short History of the GPGME bindings for Python
```

```
@author Ben McGinnes
```

```
@end titlepage
```

```
@contents
```

```
@ifnottex
```

@node Top  
@top A Short History of the GPGME bindings for Python  
@end ifnottex

@menu  
\* Overview::  
\* Relics of the past::

@detailmenu  
--- The Detailed Node Listing ---

Overview

\* In the beginning::  
\* Keeping the flame alive::  
\* Passing the torch::  
\* Coming full circle::

Relics of the past

\* The Annoyances of Git::  
\* The Perils of PyPI::

The Perils of PyPI

\* GPG 180 - Python bindings for GPGME GnuPG cryptography library::  
\* PyME 090 - Python support for GPGME GnuPG cryptography library::

@end detailmenu  
@end menu

@node Overview  
@chapter Overview

@multitable {aaaaaaaaaaaaaaaa} {aa}  
@item Version:  
@tab 0.0.1  
@item GPGME Version:  
@tab 1.13.0  
@item Author:  
@tab Ben McGinnes <ben@gnupg.org>  
@item Author GPG Key:  
@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D  
@item Language:  
@tab Australian English, British English  
@item xml:lang:  
@tab en-AU, en-GB, en  
@end multitable

The GPGME Python bindings passed through many hands and numerous phases before, after a fifteen year journey, coming full circle to return to the source. This is a short explanation of that journey.

@menu

\* In the beginning::

\* Keeping the flame alive::

\* Passing the torch::

\* Coming full circle::

@end menu

@node In the beginning

@section In the beginning

In 2002 John Goerzen released PyME; Python bindings for the GPGME module which utilised the current release of Python of the time and SWIG. @footnote{In all likelihood this would have been Python 2.2 or possibly Python 2.3.} Shortly after creating it and ensuring it worked he stopped supporting it, though he left his work available on his Gopher site.

@node Keeping the flame alive

@section Keeping the flame alive

A couple of years later the project was picked up by Igor Belyi and actively developed and maintained by him from 2004 to 2008. Igor's whereabouts at the time of this document's creation are unknown, but the current authors do hope he is well. We're assuming (or hoping) that life did what life does and made continuing untenable.

@node Passing the torch

@section Passing the torch

In 2014 Martin Albrecht wanted to patch a bug in the PyME code and discovered the absence of Igor. Following a discussion on the PyME mailing list he became the new maintainer for PyME, releasing version 0.9.0 in May of that year. He remains the maintainer of the original PyME release in Python 2.6 and 2.7 (available via PyPI).

@node Coming full circle

@section Coming full circle

In 2015 Ben McGinnes approached Martin about a Python 3 version, while investigating how complex a task this would be the task ended up being completed. A subsequent discussion with Werner Koch led to the decision to fold the Python 3 port back into the original

GPGME release in the languages subdirectory for non-C bindings under the module name of @samp{pyme3}.

In 2016 this PyME module was integrated back into the GPGME project by Justus Winter. During the course of this work Justus adjusted the port to restore limited support for Python 2, but not as many minor point releases as the original PyME package supports. During the course of this integration the package was renamed to more accurately reflect its status as a component of GPGME. The @samp{pyme3} module was renamed to @samp{gpg} and adopted by the upstream GnuPG team.

In 2017 Justus departed G10code and the GnuPG team. Following this Ben returned to maintain of gpgme Python bindings and continue building them from that point.

@node Relics of the past  
@chapter Relics of the past

There are a few things, in addition to code specific factors, such as SWIG itself, which are worth noting here.

@menu  
\* The Annoyances of Git::  
\* The Perils of PyPI::  
@end menu

@node The Annoyances of Git  
@section The Annoyances of Git

As anyone who has ever worked with git knows, submodules are horrible way to deal with pretty much anything. In the interests of avoiding migraines, that was skipped with addition of the PyME code to GPGME.

Instead the files were added to a subdirectory of the @samp{lang/} directory, along with a copy of the entire git log up to that point as a separate file within the @samp{lang/python/docs/} directory. @footnote{The entire PyME git log and other preceding VCS logs are located in the @samp{gpgme/lang/python/docs/old-commits.log} file.} As the log for PyME is nearly 100KB and the log for GPGME is approximately 1MB, this would cause considerable bloat, as well as some confusion, should the two be merged.

Hence the unfortunate, but necessary, step to simply move the files. A regular repository version has been maintained should it be possible to implement this better in the future.

@node The Perils of PyPI

## @section The Perils of PyPI

The early port of the Python 2 @samp{pyme} module as @samp{pyme3} was never added to PyPI while the focus remained on development and testing during 2015 and early 2016. Later in 2016, however, when Justus completed his major integration work and subsequently renamed the module from @samp{pyme3} to @samp{gpg}, some prior releases were also provided through PyPI.

Since these bindings require a matching release of the GPGME libraries in order to function, it was determined that there was little benefit in also providing a copy through PyPI since anyone obtaining the GPGME source code would obtain the Python bindings source code at the same time. Whereas there was the potential to sew confusion amongst Python users installing the module from PyPI, only to discover that without the relevant C files, header files or SWIG compiled binaries, the Python module did them little good.

There are only two files on PyPI which might turn up in a search for this module or a sample of its content:

```
@enumerate
```

```
@item
```

```
gpg (1.8.0) - Python bindings for GPGME GnuPG cryptography library
```

```
@item
```

```
pyme (0.9.0) - Python support for GPGME GnuPG cryptography library
```

```
@end enumerate
```

```
@menu
```

```
* GPG 180 - Python bindings for GPGME GnuPG cryptography library::
```

```
* PyME 090 - Python support for GPGME GnuPG cryptography library::
```

```
@end menu
```

```
@node GPG 180 - Python bindings for GPGME GnuPG cryptography library
```

```
@subsection GPG 180 - Python bindings for GPGME GnuPG cryptography library
```

This is the most recent version to reach PyPI and is the version of the official Python bindings which shipped with GPGME 1.8.0. If you have GPGME 1.8.0 installed and @emph{only} 1.8.0 installed, then it is probably safe to use this copy from PyPI.

As there have been a lot of changes since the release of GPGME 1.8.0, the GnuPG Project recommends not using this version of the module and instead installing the current version of GPGME along with the Python bindings included with that package.

```
@node PyME 090 - Python support for GPGME GnuPG cryptography library
```

```
@subsection PyME 090 - Python support for GPGME GnuPG cryptography library
```

This is the last release of the PyME bindings maintained by Martin Albrecht and is only compatible with Python 2, it will not work with Python 3. This is the version of the software from which the port from Python 2 to Python 3 code was made in 2015.

Users of the more recent Python bindings will recognise numerous points of similarity, but also significant differences. It is likely that the more recent official bindings will feel "more pythonic."

For those using Python 2, there is essentially no harm in using this module, but it may lack a number of more recent features added to GPGME.

@bye

```
# -*- mode: org -*-
```

```
#+TITLE: GNU Privacy Guard (GnuPG) Made Easy Python Bindings
```

```
#+AUTHOR: Ben McGinnes
```

```
#+LATEX_COMPILER: xelatex
```

```
#+LATEX_CLASS: article
```

```
#+LATEX_CLASS_OPTIONS: [12pt]
```

```
#+LATEX_HEADER: \usepackage{xltextra}
```

```
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
```

```
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
```

```
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}
```

```
* GPGME Python Bindings
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: top
```

```
:END:
```

```
** Contents
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: contents
```

```
:END:
```

```
- [[file:short-history]] [A short history of the project]
```

```
- [[file:what-is-new]] [What's New]
```

```
- [[file:maintenance-mode]] [Maintenance Mode] (from January, 2019)
```

```
- [[file:what-was-new]] [What Was New]
```

```
- [[file:gpgme-python-howto]] [GPGME Python Bindings HOWTO]
```

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
```

```
mQENBFrsKEkBCADKw4Wt8J6M/88qD8PO6lSMCxH1cpwH8iK0uPaFFYsJkkXo7kWf
```

PTAtrV+REqF/o80dvYcdLvRsV21pvncZz/HXLU1yQ18mC3XObrKokbdgrTTKA5XE  
BZkNsqyaMMJauT18H4hYkSg62/tTdO1cu/zWv/LFf7Xyn6+uA74ovXCJIO1s0N2c  
PSht98QRzPMf2owgVk37JnDNp4gGVDGHxSZOuUwXgYAZYnA8SFc+c+3ZrQfY870  
+O4j3Mz4p7yD13AwP4buQLBsb/icxekeQCqprJhLH9f7MdEcGXa1x36RcEkHdu+M  
yJ392eMgD+dKNfRCtyTPhjZTxvbNELIBYICfABEBAAG0EHRlc3RAZXhhbXBsZS5v  
cmeJAVQEEwEIAID4WIQTUFzW5Ejb9uIEjFojAWNe7/DLBQUcWuwoSQIbAwUJA8Jn  
AAULCQgHAgYVCgkICwIEFgIDAQIeAQIXgAAKCRajAWNe7/DLBf9kB/wOQ/S60HGw  
Fq07W9N01HWULyhHKOmmHL6rfZ64oDqLxolPSasz7WAMW1jN4qtWJ0mFzwO83V6  
kaBe+wF6Kqir6udFSBW9rPcFg6/VZXPIT0a6uacIHq6DyQ5iMW4YQWbVy9OR2rN  
GkYo1JCBR0XRJYCSX3yB4TWv/eXnZ37/WjmiTOIZh35rjs+NuU/S5JPDfAp2/k7  
0DevQeBsv+UjVXjWpNTZmPbvDnd995uSmC6UY4hzyP84ORYMYn9n1QAR0goxDN6U  
unOf9Rlp1oMzdxMool/d1MICxg2h3jheuhv7lgUF4KpvHOuEPXQ7UO417E0TYcDZ  
1J8Nsv87SZeEuQENBFrsKEkBCADjoEBhG/QPqZHg8VyoD1xYRAWGxyDJKX/GrSs6  
yE+x2hk5FoQCajxKa/d4AVxOnJpdwhAfeXeSNaql5Ejgzax+Tdj9BV6vtGVJVv0p  
O7bgAiZxkA6RHxtNqhpPnPQoXvUzkzpRgpuL+Nj4yIg7z1ITH6KQH4u5SI9vd+j/  
8i9Taz67pdZwuJjac8qBuJHjzAo1bjYctFYUSG5pbmMQyNLySzziNkFa4DajODlt  
3RuqVGP316Fk+Sy2+60tC/HIX8jgMyMONfOGBQx6jk8tvAphS/LAqrrNepnagIyL  
UGKU+L8cB2g1PGGp2biBFWqZbudZoyRBet/0yH/zirBdQJw1ABEBAAGJATwEGAEI  
ACYWIQTUFzW5Ejb9uIEjFojAWNe7/DLBQUcWuwoSQIbDAUJA8JnAAAKCRajAWNe  
7/DLBf0pCACPP5hBuUWngu2Hqvg+tNiujsiYzId3MffFxEk3CbXeHcJ5F32NDJ9  
PYCnra4L8wSv+Nzt9gIa8IFwoFSFQCjzH7KE86XcV3MhfdJTNb/+9CR7Jq3e/4Iy  
0N5ip7PNYMCyakcAsxvsNCJKrSaDuYe/OAoTXRBtgRWE2uyT315em02Lkr+2Cc/Q  
k6H+vINOHGRgnpl/OZZjnUuUfBUvMGHr1phW+y7aeymC9PnUGdViRdJe23nntMSD  
A+0/I7ESO9JsWvJbyBmuiZpu9JjScOjYH9xpQLqRNyW4WHpZriN69F0t9Mmd7bM1  
+UyPgbPEr0iWMeyctYsuOLeUyQKMscDT  
=QyY6

-----END PGP PUBLIC KEY BLOCK-----

\input texinfo @c -\* texinfo -\*

@c %\*\*start of header

@setfilename what-is-new.info

@settitle What's New in the GPGME Python Bindings and Documentation

@documentencoding utf-8

@documentlanguage en

@c %\*\*end of header

@finalout

@titlepage

@title What's New in the GPGME Python Bindings and Documentation

@author Ben McGinnes

@end titlepage

@contents

@ifnottex

@node Top

@top What's New in the GPGME Python Bindings and Documentation

@end ifnottex

@menu

\* What's New::

@detailmenu

--- The Detailed Node Listing ---

What's New

\* New in GPGME 1130::

@end detailmenu

@end menu

@node What's New

@chapter What's New

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.0.1

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English

@item xml:lang:

@tab en-AU, en-GB, en

@end multitable

Last time the most obviously new thing was adding the @emph{What's New} section to the HOWTO. Now it's moving it out of the HOWTO.

@menu

\* New in GPGME 1130::

@end menu

@node New in GPGME 1130

@section New in GPGME 1130

Additions since GPGME 1.12.0 include:

@itemize

@item

Moving the @emph{What's New} section out of the basic @uref{gpgme-python-howto.org, HOWTO} document and

into its own file so as to more readily include other documents

beyond that HOWTO.

@item

Moving the preceding, archival, segments into @uref{what-was-new.org, another file}.

@item

Added @samp{gpg.version.versionintlist} to make it easier for Python developers to check for a specific version number, even with beta versions (it will drop the "-betaN" part).

@item

Added expanded detail on issues pertaining to installing for Windows users.

@item

Bindings enter @uref{maintenance-mode, maintenance mode} from January, 2019.

@item

Added documentation on maintenance mode and what changes can be made to the code when in that status. Essentially that boils down to bug fixes only and no feature requests.

@item

The import-keys-hkp.py example script, which uses the @samp{hkp4py} module to search the SKS servers for a key, has been tightened up to search for both hexadecimal key IDs and user ID strings with reduced chance of unnecessary repetition. There may still be some repetition if a key includes a user ID matching the hexadecimal value of a key ID.

@end itemize

@bye

Using gpgme.js

-----

At first, make sure that the environment you want to use gpgme.js in has access and permissions for nativeMessaging, and gpgme-json installed. For details, see the README.

The library itself is started via the {@link init} method. This will test the nativeMessaging connection, and then resolve into an Object offering the top level API:

```
* [encrypt]{ @link GpgME#encrypt}
* [decrypt]{ @link GpgME#decrypt}
* [sign]{ @link GpgME#sign}
* [verify]{ @link GpgME#verify}
* [Keyring]{ @link GPGME_Keyring}
```

```
...
```

```
gpgmejs.init()
  .then(function(GPGME) {
    // using GPGME
  }, function(error){
    // error handling;
```

```
  })  
  ...
```

All methods that require communication with `nativeMessaging` are asynchronous, using Promises. Rejections will be instances of `{ @link GPGME_Error }`.

An exception are Keys, which can be initialized in a 'sync' mode, allowing them to be cached and used synchronously until manually refreshed.

## Keyring and Keys

-----  
The gnupg keys can be accessed via the `[Keyring]{ @link GPGME_Keyring }`.

The Keyring offers the methods for accessing information on all Keys known to gnupg.

**\*\*Due to security constraints, the javascript-binding currently only offers limited support for secret-Key interaction.\*\***

The existence of secret Keys is not secret, and those secret Keys can be used for signing, but Operations that may expose, modify or delete secret Keys are not supported.

```
* [getKeysArmored]{ @link GPGME_Keyring#getKeysArmored }  
* [getKeys]{ @link GPGME_Keyring#getKeys }  
* [getDefaultKey]{ @link GPGME_Keyring#getDefaultKey }  
* [generateKey]{ @link GPGME_Keyring#generateKey }  
* [deleteKey]{ @link GPGME_Keyring#deleteKey }
```

For a list of the authors of the source code of GPGME, please see the file AUTHORS. The following people supported GPGME development in various ways (for example by finding bugs or giving advice), and we want to thank them for their help. If we forgot you, please let us know.

```
Adriaan de Groot    adridg@cs.kun.nl  
Albrecht Dre       albrecht.dress@arcor.de  
Alfons Hoogervorst  alfons@proteus.demon.nl  
Daniel Mueller     daniel@danm.de  
Enno Cramer        uebergeek@web.de  
Frank Heckenbach   frank@g-n-u.de  
Igor Belyi         gpgme@katehok.ac93.org  
Jan-Oliver Wagner  jan@intevation.de  
Johannes Poehlmann jhp@caldera.de  
Jose C. Garca Sogo  jose@jaimedelamo.eu.org  
Leo Gaspard        ekleog@gmail.com  
Mark Mutz          mutz@kde.org  
Miguel Coca        mcoca@gnu.org  
Noel Torres        envite@rolamasao.org
```

Patrick Spendrin     patrick.spendrin@kdab.com  
Stphane Cortesy     stephane@sente.ch  
Timo Schulz          twoday@freakmail.de  
Tommy Reynolds      reynolds@redhat.com  
W. Trevor King      wking@tremily.us

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```
(21:protected-private-key(3:elg(1:p129:W#} }l;;m>
;4YV$Qg
LoLy~*Tru*+ID8"-9,:17^g*({ #7)(1:g1:)(1:y128:2o62,Tj/
rRi3sSS iCAYNYbVtAHKi7(UPp)?Od{'R^f)(9:protected25:openpgp-s2k3-sha1-aes-
cbc((4:sha18:fw`E7:5242880)16:aqR)192:5f1a-`{^EV699WoB\,:Rs1*W6Lu iZ
:=ZqURM47;pA3#DL
so8O)Th^P@IP0&.DR;"rkN7)(12:protected-at15:20101008T070216)))
;;; gpgme-grovel.lisp
```

```
;;; This file is part of GPGME-CL.
```

```
;;;
```

```
;;; GPGME-CL is free software; you can redistribute it and/or modify it
;;; under the terms of the GNU General Public License as published by
;;; the Free Software Foundation; either version 2 of the License, or
;;; (at your option) any later version.
```

```
;;;
```

```
;;; GPGME-CL is distributed in the hope that it will be useful, but
;;; WITHOUT ANY WARRANTY; without even the implied warranty of
;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
;;; Lesser General Public License for more details.
```

```
;;;
```

```
;;; You should have received a copy of the GNU General Public License
;;; along with GPGME; if not, write to the Free Software Foundation,
;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.
```

```
(in-package :gpgme)
```

```
(include "errno.h" "sys/types.h")
```

```
(constant (+ebadf+ "EBADF"))
```

```

(ctype off-t "off_t")
(ctype size-t "size_t")
(ctype ssize-t "ssize_t")

(cvar ("errno" *errno*) :int)
# This is a template. The dist target uses it to create the real file.
Summary: GPGME - GnuPG Made Easy
Name: gpgme
Version: 1.13.1
Release: 1
URL: https://gnupg.org/gpgme.html
Source: https://www.gnupg.org/ftp/gcrypt/gpgme/% { name }-% { version }.tar.gz
Group: Development/Libraries
Copyright: GPL
BuildRoot: % { _tmppath }/% { name }-% { version }
BuildRequires: make
Prereq: /sbin/ldconfig /sbin/install-info
Requires: gnupg

%description
GnuPG Made Easy (GPGME) is a library designed to make access to GnuPG easier
for applications. It provides a High-Level Crypto API for encryption,
decryption, signing, signature verification and key management.

%prep
%setup -q

%build
CFLAGS="$RPM_OPT_FLAGS"; export CFLAGS
./configure --prefix=/usr
make

%install
rm -fr $RPM_BUILD_ROOT
mkdir -p $RPM_BUILD_ROOT
make install prefix=$RPM_BUILD_ROOT/usr infodir=$RPM_BUILD_ROOT% { _infodir }
rm -f $RPM_BUILD_ROOT% { _infodir }/dir

%clean
rm -fr $RPM_BUILD_ROOT
make distclean

%post
/sbin/ldconfig
/sbin/install-info % { _infodir }/gpgme.info.gz % { _infodir }/dir
/sbin/install-info % { _infodir }/gpgme-python-howto.info.gz % { _infodir }/dir

%preun

```

```

if [ "$1" = 0 ]; then
/sbin/install-info --delete % {_infodir}/gpgme.info.gz % {_infodir}/dir
/sbin/install-info --delete % {_infodir}/gpgme-python-howto.info.gz % {_infodir}/dir
fi

%postun
/sbin/ldconfig

%files
%defattr(-,root,root)
%doc COPYING COPYING.LESSER AUTHORS README INSTALL NEWS ChangeLog TODO THANKS
%attr(0755,root,root) % {_bindir}/gpgme-config
%attr(0755,root,root) % {_libdir}/*gpgme.so*
%attr(0755,root,root) % {_libdir}/*gpgme.la
%attr(0644,root,root) % {_libdir}/*gpgme.a
%{_includedir}/gpgme.h
%{_datadir}/aclocal/gpgme.m4
%{_infodir}/gpgme.info*
%{_infodir}/gpgme-python-howto.info*

%changelog
* Sat Aug 30 2003 Robert Schiele <rschiele@uni-mannheim.de>
- % {_infodir}/dir is not packaged, remove to prevent checking failure
* Mon Jul 01 2002 Wojciech Polak <polak@lodz.pdi.net>
- initial specfile release for GPGME.

# EOF
# *- mode: org -*-
#+TITLE: GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
#+AUTHOR: Ben McGinnes
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

* Introduction
:PROPERTIES:
:CUSTOM_ID: intro
:END:

| Version:      | 0.1.5          |
| GPGME Version: | 1.13.0        |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |

```

| Language: | Australian English, British English |  
| Language codes: | en-AU, en-GB, en |

This document provides basic instruction in how to use the GPGME Python bindings to programmatically leverage the GPGME library.

```
** Python 2 versus Python 3
:PROPERTIES:
:CUSTOM_ID: py2-vs-py3
:END:
```

Though the GPGME Python bindings themselves provide support for both Python 2 and 3, the focus is unequivocally on Python 3 and specifically from Python 3.4 and above. As a consequence all the examples and instructions in this guide use Python 3 code.

Much of it will work with Python 2, but much of it also deals with Python 3 byte literals, particularly when reading and writing data. Developers concentrating on Python 2.7, and possibly even 2.6, will need to make the appropriate modifications to support the older string and unicode types as opposed to bytes.

There are multiple reasons for concentrating on Python 3; some of which relate to the immediate integration of these bindings, some of which relate to longer term plans for both GPGME and the python bindings and some of which relate to the impending EOL period for Python 2.7. Essentially, though, there is little value in tying the bindings to a version of the language which is a dead end and the advantages offered by Python 3 over Python 2 make handling the data types with which GPGME deals considerably easier.

```
** Examples
:PROPERTIES:
:CUSTOM_ID: howto-python3-examples
:END:
```

All of the examples found in this document can be found as Python 3 scripts in the =lang/python/examples/howto= directory.

```
** Unofficial Drafts
:PROPERTIES:
:CUSTOM_ID: unofficial-drafts
:END:
```

In addition to shipping with each release of GPGME, there is a section

on locations to read or download [\[#draft-editions\]\[draft editions\]](#) of this document from at the end of it. These are unofficial versions produced in between major releases.

**\*\* What's New**

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff  
:END:
```

Full details of what is new are now available in the [\[\[file:what-is-new.org\]\[What's New\]\]](#) file and archives of the preceding /What's New/ sections are available in the [\[\[file:what-was-new\]\[What Was New\]\]](#) file.

**\*\*\* New in GPGME 1130**

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff-1-13-0  
:END:
```

See the [\[\[file:what-is-new#new-stuff-1-13-0\]\[What's New\]\]](#) document for what is new in version 1.13.0.

**\*\*\* New in GPGME 1120**

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff-1-12-0  
:END:
```

See the [\[\[file:what-was-new#new-stuff-1-12-0\]\[What Was New\]\]](#) document for what was new in version 1.12.0.

**\* GPGME Concepts**

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-concepts  
:END:
```

**\*\* A C API**

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-c-api  
:END:
```

Unlike many modern APIs with which programmers will be more familiar with these days, the GPGME API is a C API. The API is intended for use by C coders who would be able to access its features by including the `=gpgme.h=` header file with their own C source code and then access its functions just as they would any other C headers.

This is a very effective method of gaining complete access to the API and in the most efficient manner possible. It does, however, have the drawback that it cannot be directly used by other languages without some means of providing an interface to those languages. This is where the need for bindings in various languages stems.

\*\* Python bindings

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-python-bindings  
:END:
```

The Python bindings for GPGME provide a higher level means of accessing the complete feature set of GPGME itself. It also provides a more pythonic means of calling these API functions.

The bindings are generated dynamically with SWIG and the copy of `gpgme.h` generated when GPGME is compiled.

This means that a version of the Python bindings is fundamentally tied to the exact same version of GPGME used to generate that copy of `gpgme.h`.

\*\* Difference between the Python bindings and other GnuPG Python packages

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-python-bindings-diffs  
:END:
```

There have been numerous attempts to add GnuPG support to Python over the years. Some of the most well known are listed here, along with what differentiates them.

\*\*\* The `python-gnupg` package maintained by Vinay Sajip

```
:PROPERTIES:  
:CUSTOM_ID: diffs-python-gnupg  
:END:
```

This is arguably the most popular means of integrating GPG with Python. The package utilises the `subprocess` module to implement wrappers for the `gpg` and `gpg2` executables normally invoked on the command line (`gpg.exe` and `gpg2.exe` on Windows).

The popularity of this package stemmed from its ease of use and capability in providing the most commonly required features.

Unfortunately it has been beset by a number of security issues in the

past; most of which stemmed from using unsafe methods of accessing the command line via the `=subprocess=` calls. While some effort has been made over the last two to three years (as of 2018) to mitigate this, particularly by no longer providing shell access through those subprocess calls, the wrapper is still somewhat limited in the scope of its GnuPG features coverage.

The `python-gnupg` package is available under the MIT license.

```
*** The gnupg package created and maintained by Isis Lovecruft
:PROPERTIES:
:CUSTOM_ID: diffs-isis-gnupg
:END:
```

In 2015 Isis Lovecruft from the Tor Project forked and then re-implemented the `python-gnupg` package as just `gnupg`. This new package also relied on `subprocess` to call the `=gpg=` or `=gpg2=` binaries, but did so somewhat more securely.

The naming and version numbering selected for this package, however, resulted in conflicts with the original `python-gnupg` and since its functions were called in a different manner to `python-gnupg`, the release of this package also resulted in a great deal of consternation when people installed what they thought was an upgrade that subsequently broke the code relying on it.

The `gnupg` package is available under the GNU General Public License version 3.0 (or any later version).

```
*** The PyME package maintained by Martin Albrecht
:PROPERTIES:
:CUSTOM_ID: diffs-pyme
:END:
```

This package is the origin of these bindings, though they are somewhat different now. For details of when and how the PyME package was folded back into GPGME itself see the [\[\[file:short-history.org\]\]](http://file:short-history.org) [\[Short History\]](#) document.<sup>[fn:1]</sup>

The PyME package was first released in 2002 and was also the first attempt to implement a low level binding to GPGME. In doing so it provided access to considerably more functionality than either the `=python-gnupg=` or `=gnupg=` packages.

The PyME package is only available for Python 2.6 and 2.7.

Porting the PyME package to Python 3.4 in 2015 is what resulted in it

being folded into the GPGME project and the current bindings are the end result of that effort.

The PyME package is available under the same dual licensing as GPGME itself: the GNU General Public License version 2.0 (or any later version) and the GNU Lesser General Public License version 2.1 (or any later version).

```
* GPGME Python bindings installation
:PROPERTIES:
:CUSTOM_ID: gpgme-python-install
:END:
```

```
** No PyPI
:PROPERTIES:
:CUSTOM_ID: do-not-use-pypi
:END:
```

Most third-party Python packages and modules are available and distributed through the Python Package Installer, known as PyPI.

Due to the nature of what these bindings are and how they work, it is infeasible to install the GPGME Python bindings in the same way.

This is because the bindings use SWIG to dynamically generate C bindings against `gpgme.h` and `gpgme.h` is generated from `gpgme.h.in` at compile time when GPGME is built from source. Thus to include a package in PyPI which actually built correctly would require either statically built libraries for every architecture bundled with it or a full implementation of C for each architecture.

See the additional notes regarding [CFFI and SWIG](#) at the end of this section for further details.

```
** Requirements
:PROPERTIES:
:CUSTOM_ID: gpgme-python-requirements
:END:
```

The GPGME Python bindings only have three requirements:

1. A suitable version of Python 2 or Python 3. With Python 2 that means CPython 2.7 and with Python 3 that means CPython 3.4 or higher.
2. <https://www.swig.org>.

3. GPGME itself. Which also means that all of GPGME's dependencies must be installed too.

\*\*\* Recommended Additions

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-python-recommendations  
:END:
```

Though none of the following are absolute requirements, they are all recommended for use with the Python bindings. In some cases these recommendations refer to which version(s) of CPython to use the bindings with, while others refer to third party modules which provide a significant advantage in some way.

1. If possible, use Python 3 instead of 2.
2. Favour a more recent version of Python since even 3.4 is due to reach EOL soon. In production systems and services, Python 3.6 should be robust enough to be relied on.
3. If possible add the following Python modules which are not part of the standard library: [[<http://docs.python-requests.org/en/latest/index.html>][Requests]], [[<https://cython.org/>][Cython]], [[<https://pendulum.eustace.io/>][Pendulum]] and [[<https://github.com/Selfnet/hkp4py>][hkp4py]].

Chances are quite high that at least the first one and maybe two of those will already be installed.

Note that, as with Cython, some of advanced use case scenarios will bring with them additional requirements. Most of these will be fairly well known and commonly installed ones, however, which are in many cases likely to have already been installed on many systems or be familiar to Python programmers.

\*\* Installation

```
:PROPERTIES:  
:CUSTOM_ID: installation  
:END:
```

Installing the Python bindings is effectively achieved by compiling and installing GPGME itself.

Once SWIG is installed with Python and all the dependencies for GPGME are installed you only need to confirm that the version(s) of Python you want the bindings installed for are in your =`$PATH`=.

By default GPGME will attempt to install the bindings for the most recent or highest version number of Python 2 and Python 3 it detects

in `=$PATH=`. It specifically checks for the `=python=` and `=python3=` executables first and then checks for specific version numbers.

For Python 2 it checks for these executables in this order: `=python=`, `=python2=` and `=python2.7=`.

For Python 3 it checks for these executables in this order: `=python3=`, `=python3.7=`, `=python3.6=`, `=python3.5=` and `=python3.4=`.<sup>[fn:2]</sup>

On systems where `=python=` is actually `=python3=` and not `=python2=` it may be possible that `=python2=` may be overlooked, but there have been no reports of that actually occurring as yet.

In the three months or so since the release of Python 3.7.0 there has been extensive testing and work with these bindings with no issues specifically relating to the new version of Python or any of the new features of either the language or the bindings. This has also been the case with Python 3.7.1rc1. With that in mind and given the release of Python 3.7.1 is scheduled for around the same time as GPGME 1.12.0, the order of preferred Python versions has been changed to move Python 3.7 ahead of Python 3.6.

### \*\*\* Installing GPGME

```
:PROPERTIES:  
:CUSTOM_ID: install-gpgme  
:END:
```

See the GPGME `=README=` file for details of how to install GPGME from source.

### \*\* Known Issues

```
:PROPERTIES:  
:CUSTOM_ID: snafu  
:END:
```

There are a few known issues with the current build process and the Python bindings. For the most part these are easily addressed should they be encountered.

### \*\*\* Breaking Builds

```
:PROPERTIES:  
:CUSTOM_ID: snafu-a-swig-of-this-builds-character  
:END:
```

Occasionally when installing GPGME with the Python bindings included

it may be observed that the `=make=` portion of that process induces a large very number of warnings and, eventually errors which end that part of the build process. Yet following that with `=make check=` and `=make install=` appears to work seamlessly.

The cause of this is related to the way SWIG needs to be called to dynamically generate the C bindings for GPGME in the first place. So the entire process will always produce `=lang/python/python2-gpg/=` and `=lang/python/python3-gpg/=` directories. These should contain the build output generated during compilation, including the complete bindings and module installed into `=site-packages=`.

Occasionally the errors in the early part or some other conflict (e.g. not installing as `*/root/*` or `*/su/*`) may result in nothing being installed to the relevant `=site-packages=` directory and the build directory missing a lot of expected files. Even when this occurs, the solution is actually quite simple and will always work.

That solution is simply to run the following commands as either the `*root*` user or prepended with `=sudo -H=[fn:3]` in the `=lang/python/=` directory:

```
#+BEGIN_SRC shell
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py install
#+END_SRC
```

Yes, the build command does need to be run twice. Yes, you still need to run the potentially failing or incomplete steps during the `=configure=`, `=make=` and `=make install=` steps with installing GPGME. This is because those steps generate a lot of essential files needed, both by and in order to create, the bindings (including both the `=setup.py=` and `=gpgme.h=` files).

```
**** IMPORTANT Note
:PROPERTIES:
:CUSTOM_ID: snafu-swig-build-note
:END:
```

If specifying a selected number of languages to create bindings for, try to leave Python last. Currently the majority of the other language bindings are also preceding Python of either version when listed alphabetically (not counting the Qt bindings).

If Python is set to precede one of the other languages then it is possible that the errors described here may interrupt the build

process before generating bindings for those other languages. In these cases it may be preferable to configure all preferred language bindings separately with alternative `=configure=` steps for GPGME using the `--enable-languages=$LANGUAGE=` option.

Alternatively `=make=` (or `=gmake=`, depending on your platform) may be run with the `=-k=` option, which tells make to keep going even if errors are encountered. In that case the failure of one language's set of bindings to build should not hamper another language's bindings to build.

\*\*\* Reinstalling Responsibly

```
:PROPERTIES:  
:CUSTOM_ID: snafu-lessons-for-the-lazy  
:END:
```

Regardless of whether you're installing for one version of Python or several, there will come a point where reinstallation is required. With most Python module installations, the installed files go into the relevant `site-packages` directory and are then forgotten about. Then the module is upgraded, the new files are copied over the old and that's the end of the matter.

While the same is true of these bindings, there have been intermittent issues observed on some platforms which have benefited significantly from removing all the previous installations of the bindings before installing the updated versions.

Removing the previous version(s) is simply a matter of changing to the relevant `=site-packages=` directory for the version of Python in question and removing the `=gpg/=` directory and any accompanying `egg-info` files for that module.

In most cases this will require root or administration privileges on the system, but the same is true of installing the module in the first place.

\*\*\* Multiple installations

```
:PROPERTIES:  
:CUSTOM_ID: snafu-the-full-monty  
:END:
```

For a variety of reasons it may be either necessary or just preferable to install the bindings to alternative installed Python versions which meet the requirements of these bindings.

On POSIX systems this will generally be most simply achieved by running the manual installation commands (build, build, install) as described in the previous section for each Python installation the bindings need to be installed to.

As per the SWIG documentation: the compilers, libraries and runtime used to build GPGME and the Python Bindings \*must\* match those used to compile Python itself, including the version number(s) (at least going by major version numbers and probably minor numbers too).

On most POSIX systems, including OS X, this will very likely be the case in most, if not all, cases.

Note that from GPGME [[<https://dev.gnupg.org/rMff6ff616aea6f59b7f2ce1176492850ecdf3851e>][1.12.1]] the default installation installs to each version of Python it can find first. That is that it will currently install for the first copies of Python versions 2.7, 3.4, 3.5, 3.6, 3.7 and 3.8 (dev branch) that it finds. Usually this will be in the same prefix as GPGME itself, but is dictated by the =`$PATH`= when the installation is performed. The above instructions can still be performed on other python installations which the installer does not find, including alternative prefixes.

\*\*\* Won't Work With Windows

```
:PROPERTIES:  
:CUSTOM_ID: snafu-runtime-not-funtime  
:END:
```

There are semi-regular reports of Windows users having considerable difficulty in installing and using the Python bindings at all. Very often, possibly even always, these reports come from Cygwin users and/or MinGW users and/or Msys2 users. Though not all of them have been confirmed, it appears that these reports have also come from people who installed Python using the Windows installer files from the [[<https://python.org>][Python website]] (i.e. mostly MSI installers, sometimes self-extracting =.exe= files).

The Windows versions of Python are not built using Cygwin, MinGW or Msys2; they're built using Microsoft Visual Studio. Furthermore the version used is /considerably/ more advanced than the version which MinGW obtained a small number of files from many years ago in order to be able to compile anything at all. Not only that, but there are changes to the version of Visual Studio between some micro releases, though that is particularly the case with Python 2.7, since it has been kept around far longer than it should have been.

There are two theoretical solutions to this issue:

1. Compile and install the GnuPG stack, including GPGME and the Python bindings using the same version of Microsoft Visual Studio used by the Python Foundation to compile the version of Python installed.

If there are multiple versions of Python then this will need to be done with each different version of Visual Studio used for those versions of Python.

2. Compile and install Python using the same tools used by choice, such as MinGW or Msys2.

Do *\*not\** use the official Windows installer for Python unless following the first method.

In this type of situation it may even be for the best to accept that there are less limitations on permissive software than free software and simply opt to use a recent version of the Community Edition of Microsoft Visual Studio to compile and build all of it, no matter what.

Investigations into the extent or the limitations of this issue are ongoing.

The following table lists the version of Microsoft Visual Studio which needs to be used when compiling GPGME and the Python bindings with each version of the CPython binary released [<https://www.python.org/downloads/windows/>][for Windows]:

| CPython | Microsoft product name | runtime filename   |
|---------|------------------------|--------------------|
| 2.7.6   | Visual Studio 2008     | MSVCR90.DLL        |
| 3.4.0   | Visual Studio 2010     | MSVCR100.DLL       |
| 3.5.0   | Visual Studio 2015     | <i>*see below*</i> |
| 3.6.0   | Visual Studio 2015     | <i>*see below*</i> |
| 3.7.0   | Visual Studio 2017*    | <i>*see below*</i> |

It is important to note that MingW and Msys2 ship with the Visual C runtime from Microsoft Visual Studio 2005 and are thus *\*incompatible\** with all the versions of CPython which can be used with the GPGME Python bindings.

It is also important to note that from CPython 3.5 onwards, the Python Foundation has adopted the reworking of the Visual C runtime which was performed for Visual Studio 2015 and aimed at resolving many of these kinds of issues. Much greater detail on these issues and the correct file(s) to link to are available from Matthew Brett's invaluable page, [[https://matthew-brett.github.io/pydagogue/python\\_msvc.html](https://matthew-brett.github.io/pydagogue/python_msvc.html)][Using Microsoft Visual C with Python]. It is also

worth reading the

Microsoft Developer Network blog post on [\[\[http://blogs.msdn.com/b/vcblog/archive/2015/03/03/introducing-the-universal-crt.aspx\]\]](http://blogs.msdn.com/b/vcblog/archive/2015/03/03/introducing-the-universal-crt.aspx) [the universal CRT]] and Steve Dower's blog posts on Python extensions ([\[\[http://stevedower.id.au/blog/building-for-python-3-5\]\]](http://stevedower.id.au/blog/building-for-python-3-5) [part 1]] and [\[\[http://stevedower.id.au/blog/building-for-python-3-5-part-two\]\]](http://stevedower.id.au/blog/building-for-python-3-5-part-two) [part 2]]).

The second of those two posts by Steve Dower contains the details of specific configuration options required for compiling anything to be used with official CPython releases. In addition to those configuration and compiler settings to use, the versions of Visual Studio prior to Visual Studio 2015 did not support 64-bit systems by default. So compiling a 64-bit version of these bindings for a 64-bit version of CPython 2.7 or 3.4 requires additional work.

In addition to the blog posts, the [\[\[https://wiki.python.org/moin/WindowsCompilers\]\]](https://wiki.python.org/moin/WindowsCompilers) [Windows compilers]] wiki page on the CPython wiki is another essential reference on the relevant versions of Visual Studio to use and the degree of compatibility with CPython releases.

Eventually someone will ask why there isn't an installable binary for Windows, which the GPGME of the licenses do not preclude as long as the source code is available in conjunction with such a release.

The sheer number of versions of Visual Studio in conjunction with differing configuration options depending on the target Windows version and whether the architecture is 64-bit or 32-bit makes it difficult to provide a correct binary installer for Windows users. At the bare minimum doing so would require the GnuPG project compile ten different versions of the bindings with each release; both 32-bit and 64-bit versions for CPython 2.7 and 3.4, with 64-bit versions for both x86-64 (i.e. Intel and AMD) and ARM architectures for CPython 3.5, 3.6, 3.7 and later releases. That's the bare \*minimum\*, it'd probably be higher.

Additionally, with only a binary installation used in conjunction with the CPython installer from [python.org](http://python.org) the advanced options available which utilise [\[\[#cython\]\]](http://cython.org) [Cython]] will not be able to be used at all. Cython depends on being able to compile the C code it generates and that too would need to utilise a matching runtime to both the installed version of CPython and these bindings in order to work with the bindings.

Considering all of that, what do we recommend?

1. Use a recent version of CPython; at least 3.5, but ideally 3.6 or later.
2. Use Visual Studio 2015 or the standalone build tools for Visual

Studio 2017 (or later).

3. Compile both CPython and GPGME with these bindings using the tools selected in step 2.
4. Ignore MingW, Msys2 and the official CPython binary installers.
5. Be thankful the answer to this question wasn't simply to say something like, install Linux or install FreeBSD (or even Apple's OS X).

```
*** CFFI is the Best and GPGME should use it instead of SWIG
:PROPERTIES:
:CUSTOM_ID: snafu-cffi
:END:
```

There are many reasons for favouring [\[\[https://cffi.readthedocs.io/en/latest/overview.html\]\]](https://cffi.readthedocs.io/en/latest/overview.html) and proponents of it are quite happy to repeat these things as if all it would take to switch from SWIG to CFFI is repeating that list as if it were a new concept.

The fact is that there are things which Python's CFFI implementation cannot handle in the GPGME C code. Beyond that there are features of SWIG which are simply not available with CFFI at all. SWIG generates the bindings to Python using the `=gpgme.h=` file, but that file is not a single version shipped with each release, it too is generated when GPGME is compiled.

CFFI is currently unable to adapt to such a potentially mutable codebase. If there were some means of applying SWIG's dynamic code generation to produce the Python/CFFI API modes of accessing the GPGME libraries (or the source source code directly), but such a thing does not exist yet either and it currently appears that work is needed in at least one of CFFI's dependencies before any of this can be addressed.

So if you're a massive fan of CFFI; that's great, but if you want this project to switch to CFFI then rather than just insisting that it should, I'd suggest you volunteer to bring CFFI up to the level this project needs.

If you're actually seriously considering doing so, then I'd suggest taking the `=gpgme-tool.c=` file in the GPGME `=src/=` directory and getting that to work with any of the CFFI API methods (not the ABI methods, they'll work with pretty much anything). When you start running into trouble with "ifdefs" then you'll know what sort of things are lacking. That doesn't even take into account the amount of

work saved via SWIG's code generation techniques either.

\*\*\* Virtualised Environments

```
:PROPERTIES:  
:CUSTOM_ID: snafu-venv  
:END:
```

It is fairly common practice amongst Python developers to, as much as possible, use packages like virtualenv to keep various things that are to be installed from interfering with each other. Given how much of the GPGME bindings is often at odds with the usual pythonic way of doing things, it stands to reason that this would be called into question too.

As it happens the answer as to whether or not the bindings can be used with virtualenv, the answer is both yes and no.

In general we recommend installing to the relevant path and matching prefix of GPGME itself. Which means that when GPGME, and ideally the rest of the GnuPG stack, is installed to a prefix like `=/usr/local=` or `=/opt/local=` then the bindings would need to be installed to the main Python installation and not a virtualised abstraction. Attempts to separate the two in the past have been known to cause weird and intermittent errors ranging from minor annoyances to complete failures in the build process.

As a consequence we only recommend building with and installing to the main Python installations within the same prefix as GPGME is installed to or which are found by GPGME's configuration stage immediately prior to running the make commands. Which is exactly what the compiling and installing process of GPGME does by default.

Once that is done, however, it appears that a copy of the compiled module may be installed into a virtualenv of the same major and minor version matching the build. Alternatively it is possible to utilise a `=sites.pth=` file in the `=site-packages/=` directory of a virtualenv installation, which links back to the system installations corresponding directory in order to import anything installed system wide. This may or may not be appropriate on a case by case basis.

Though extensive testing of either of these options is not yet complete, preliminary testing of them indicates that both are viable as long as the main installation is complete. Which means that certain other options normally restricted to virtual environments are also available, including integration with pythonic test suites (e.g. [\[\[https://docs.pytest.org/en/latest/index.html\]\]](https://docs.pytest.org/en/latest/index.html)`[[pytest]]`) and other large projects.

That said, it is worth reiterating the warning regarding non-standard installations. If one were to attempt to install the bindings only to a virtual environment without somehow also including the full GnuPG stack (or enough of it as to include GPGME) then it is highly likely that errors would be encountered at some point and more than a little likely that the build process itself would break.

If a degree of separation from the main operating system is still required in spite of these warnings, then consider other forms of virtualisation. Either a virtual machine (e.g. [\[\[https://www.virtualbox.org/\]\]](https://www.virtualbox.org/)[[VirtualBox]], a hardware emulation layer (e.g. [\[\[https://www.qemu.org/\]\]](https://www.qemu.org/)[[QEMU]]) or an application container (e.g. [\[\[https://www.docker.com/why-docker/\]\]](https://www.docker.com/why-docker/)[[Docker]]).

Finally it should be noted that the limited tests conducted thus far have been using the `=virtualenv=` command in a new directory to create the virtual python environment. As opposed to the standard `=python3 -m venv=` and it is possible that this will make a difference depending on the system and version of Python in use. Another option is to run the command `=python3 -m virtualenv /path/to/install/virtual/thingy=` instead.

\*\*\* Post installation

```
:PROPERTIES:  
:CUSTOM_ID: snafu-docs  
:END:
```

Following installation it is recommended to move the `=post_installer.py=` script from the `=lang/python/examples/howto/=` directory to the `=lang/python/=` directory and run it. This will fix or restore files needed by Sphinx which may be removed during a distribution build for release. It will also generate reST files from Org mode files with Pandoc and generate Texinfo files from Org mode files with GNU Emacs and Org mode (in batch mode). Additionally it will fix the UTF-8 declaration line in the Texinfo files (Emacs expects "UTF-8" to be "utf-8").

\* Fundamentals

```
:PROPERTIES:  
:CUSTOM_ID: howto-fund-a-mental  
:END:
```

Before we can get to the fun stuff, there are a few matters regarding GPGME's design which hold true whether you're dealing with the C code directly or these Python bindings.

\*\* No REST

```
:PROPERTIES:  
:CUSTOM_ID: no-rest-for-the-wicked  
:END:
```

The first part of which is or will be fairly blatantly obvious upon viewing the first example, but it's worth reiterating anyway. That being that this API is *not* a REST API. Nor indeed could it ever be one.

Most, if not all, Python programmers (and not just Python programmers) know how easy it is to work with a RESTful API. In fact they've become so popular that many other APIs attempt to emulate REST-like behaviour as much as they are able. Right down to the use of JSON formatted output to facilitate the use of their API without having to retrain developers.

This API does not do that. It would not be able to do that and also provide access to the entire C API on which it's built. It does, however, provide a very pythonic interface on top of the direct bindings and it's this pythonic layer that this HOWTO deals with.

\*\* Context

```
:PROPERTIES:  
:CUSTOM_ID: howto-get-context  
:END:
```

One of the reasons which prevents this API from being RESTful is that most operations require more than one instruction to the API to perform the task. Sure, there are certain functions which can be performed simultaneously, particularly if the result known or strongly anticipated (e.g. selecting and encrypting to a key known to be in the public keybox).

There are many more, however, which cannot be manipulated so readily: they must be performed in a specific sequence and the result of one operation has a direct bearing on the outcome of subsequent operations. Not merely by generating an error either.

When dealing with this type of persistent state on the web, full of both the RESTful and REST-like, it's most commonly referred to as a session. In GPGME, however, it is called a context and every operation type has one.

\* Working with keys

```
:PROPERTIES:
```

```
:CUSTOM_ID: howto-keys
```

```
:END:
```

```
** Key selection
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: howto-keys-selection
```

```
:END:
```

Selecting keys to encrypt to or to sign with will be a common occurrence when working with GPGMe and the means available for doing so are quite simple.

They do depend on utilising a Context; however once the data is recorded in another variable, that Context does not need to be the same one which subsequent operations are performed.

The easiest way to select a specific key is by searching for that key's key ID or fingerprint, preferably the full fingerprint without any spaces in it. A long key ID will probably be okay, but is not advised and short key IDs are already a problem with some being generated to match specific patterns. It does not matter whether the pattern is upper or lower case.

So this is the best method:

```
#+BEGIN_SRC python -i
import gpg
```

```
k = gpg.Context().keylist(pattern="258E88DCBD3CD44D8E7AB43F6ECB6AF0DEADBEEF")
keys = list(k)
#+END_SRC
```

This is passable and very likely to be common:

```
#+BEGIN_SRC python -i
import gpg
```

```
k = gpg.Context().keylist(pattern="0x6ECB6AF0DEADBEEF")
keys = list(k)
#+END_SRC
```

And this is a really bad idea:

```
#+BEGIN_SRC python -i
import gpg
```

```
k = gpg.Context().keylist(pattern="0xDEADBEEF")
```

```
keys = list(k)
#+END_SRC
```

Alternatively it may be that the intention is to create a list of keys which all match a particular search string. For instance all the addresses at a particular domain, like this:

```
#+BEGIN_SRC python -i
import gpg

ncsc = gpg.Context().keylist(pattern="ncsc.mil")
nsa = list(ncsc)
#+END_SRC
```

```
*** Counting keys
:PROPERTIES:
:CUSTOM_ID: howto-keys-counting
:END:
```

Counting the number of keys in your public keybox (=pubring.kbx=), the format which has superseded the old keyring format (=pubring.gpg= and =secring.gpg=), or the number of secret keys is a very simple task.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
seckeys = c.keylist(pattern=None, secret=True)
pubkeys = c.keylist(pattern=None, secret=False)

seclist = list(seckeys)
secnum = len(seclist)

publist = list(pubkeys)
pubnum = len(publist)

print("""
Number of secret keys: {0}
Number of public keys: {1}
""".format(secnum, pubnum))
#+END_SRC
```

NOTE: The `[[#cython]][Cython]` introduction in the `[[#advanced-use]][Advanced and Experimental]` section uses this same key counting code with Cython to demonstrate some areas where Cython can improve performance even with the bindings. Users with large public keyrings or keyboxes, for instance, should consider these options if they are comfortable with using

Cython.

```
** Get key
:PROPERTIES:
:CUSTOM_ID: howto-get-key
:END:
```

An alternative method of getting a single key via its fingerprint is available directly within a Context with `=Context().get_key=`. This is the preferred method of selecting a key in order to modify it, sign or certify it and for obtaining relevant data about a single key as a part of other functions; when verifying a signature made by that key, for instance.

By default this method will select public keys, but it can select secret keys as well.

This first example demonstrates selecting the current key of Werner Koch, which is due to expire at the end of 2018:

```
#+BEGIN_SRC python -i
import gpg

fingerprint = "80615870F5BAD690333686D0F2AD85AC1E42B367"
key = gpg.Context().get_key(fingerprint)
#+END_SRC
```

Whereas this example demonstrates selecting the author's current key with the `=secret=` key word argument set to `=True=`:

```
#+BEGIN_SRC python -i
import gpg

fingerprint = "DB4724E6FA4286C92B4E55C4321E4E2373590E5D"
key = gpg.Context().get_key(fingerprint, secret=True)
#+END_SRC
```

It is, of course, quite possible to select expired, disabled and revoked keys with this function, but only to effectively display information about those keys.

It is also possible to use both unicode or string literals and byte literals with the fingerprint when getting a key in this way.

```
** Importing keys
:PROPERTIES:
```

```
:CUSTOM_ID: howto-import-key
:END:
```

Importing keys is possible with the `key_import()` method and takes one argument which is a bytes literal object containing either the binary or ASCII armoured key data for one or more keys.

The following example retrieves one or more keys from the SKS key servers via the web using the requests module. Since requests returns the content as a bytes literal object, we can then use that directly to import the resulting data into our keybox.

```
#+BEGIN_SRC python -i
import gpg
import os.path
import requests

c = gpg.Context()
url = "https://sks-key servers.net/pks/lookup"
pattern = input("Enter the pattern to search for key or user IDs: ")
payload = {"op": "get", "search": pattern}

r = requests.get(url, verify=True, params=payload)
result = c.key_import(r.content)

if result is not None and hasattr(result, "considered") is False:
    print(result)
elif result is not None and hasattr(result, "considered") is True:
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scr = result.secret_imported
    nochange = result.unchanged
    print("""
The total number of keys considered for import was: {0}

    Number of keys revoked: {1}
    Number of new signatures: {2}
    Number of new subkeys: {3}
    Number of new user IDs: {4}
    Number of new secret keys: {5}
    Number of unchanged keys: {6}

The key IDs for all considered keys were:
""".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scr,
           nochange))
```

```

    for i in range(num_keys):
        print("{0}\n".format(result.imports[i].fpr))
else:
    pass
#+END_SRC

```

NOTE: When searching for a key ID of any length or a fingerprint (without spaces), the SKS servers require the the leading =0x= indicative of hexadecimal be included. Also note that the old short key IDs (e.g. =0xDEADBEEF=) should no longer be used due to the relative ease by which such key IDs can be reproduced, as demonstrated by the Evil32 Project in 2014 (which was subsequently exploited in 2016).

Testing for whether a string in any given search is or may be a hexadecimal value which may be missing the leading =0x= is a simple matter of using a try/except statement which attempts to convert the string as hex to an integer and then back to hex; then using that to search with. Raising a ValueError simply results in treating the string as a string. This is the method and logic utilised in the =import-keys-hkp.py= script (see below).

```

*** Working with ProtonMail
:PROPERTIES:
:CUSTOM_ID: import-protonmail
:END:

```

Here is a variation on the example above which checks the constrained ProtonMail keyserver for ProtonMail public keys.

```

#+BEGIN_SRC python -i
import gpg
import requests
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it.
""")

c = gpg.Context(armor=True)
url = "https://api.protonmail.ch/pks/lookup"
ksearch = []

if len(sys.argv) >= 2:
    keyterm = sys.argv[1]
else:

```

```

keyterm = input("Enter the key ID, UID or search string: ")

if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
    ksearch.append("{}@protonmail.com".format(keyterm[1:]))
    ksearch.append("{}@protonmail.ch".format(keyterm[1:]))
    ksearch.append("{}@pm.me".format(keyterm[1:]))
elif keyterm.count("@") == 0:
    ksearch.append("{}@protonmail.com".format(keyterm))
    ksearch.append("{}@protonmail.ch".format(keyterm))
    ksearch.append("{}@pm.me".format(keyterm))
elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{}@protonmail.com".format(uid))
        ksearch.append("{}@protonmail.ch".format(uid))
        ksearch.append("{}@pm.me".format(uid))
elif keyterm.count("@") > 2:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{}@protonmail.com".format(uid))
        ksearch.append("{}@protonmail.ch".format(uid))
        ksearch.append("{}@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    payload = {"op": "get", "search": k}
    try:
        r = requests.get(url, verify=True, params=payload)
        if r.ok is True:
            result = c.key_import(r.content)
        elif r.ok is False:
            result = r.content
    except Exception as e:
        result = None

if result is not None and hasattr(result, "considered") is False:
    print("{} for {}".format(result.decode(), k))
elif result is not None and hasattr(result, "considered") is True:
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids

```

```
new_scert = result.secret_imported
nochange = result.unchanged
print("""
The total number of keys considered for import was: {0}
```

With UIDs wholly or partially matching the following string:

```
{1}
```

```
Number of keys revoked: {2}
Number of new signatures: {3}
Number of new subkeys: {4}
Number of new user IDs: {5}
Number of new secret keys: {6}
Number of unchanged keys: {7}
```

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    print(e)
#+END_SRC
```

Both the above example, [\[./examples/howto/pmkey-import.py\]\[pmkey-import.py\]](#), and a version which prompts for an alternative GnuPG home directory, [\[./examples/howto/pmkey-import-alt.py\]\[pmkey-import-alt.py\]](#), are available with the other examples and are executable scripts.

Note that while the ProtonMail servers are based on the SKS servers, their server is related more to their API and is not feature complete by comparison to the servers in the SKS pool. One notable difference being that the ProtonMail server does not permit non ProtonMail users to update their own keys, which could be a vector for attacking ProtonMail users who may not receive a key's revocation if it had been compromised.

```
*** Importing with HKP for Python
:PROPERTIES:
:CUSTOM_ID: import-hkp4py
:END:
```

Performing the same tasks with the [\[https://github.com/Selfnet/hkp4py\]\[hkp4py module\]](https://github.com/Selfnet/hkp4py) (available via PyPI) is not too much different, but does provide a number of options of benefit to end users. Not least of which being the ability to perform some checks on a key before importing it or not. For instance it may

be the policy of a site or project to only import keys which have not been revoked. The hkp4py module permits such checks prior to the importing of the keys found.

```
#+BEGIN_SRC python -i
import gpg
import hkp4py
import sys

c = gpg.Context()
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")
results = []
keys = []

if len(sys.argv) > 2:
    pattern = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    pattern = sys.argv[1]
else:
    pattern = input("Enter the pattern to search for keys or user IDs: ")

if pattern is not None:
    try:
        key = server.search(hex(int(pattern, 16)))
        keyed = True
    except ValueError as ve:
        key = server.search(pattern)
        keyed = False

    if key is not None:
        keys.append(key[0])
        if keyed is True:
            try:
                fob = server.search(pattern)
            except:
                fob = None
            if fob is not None:
                keys.append(fob[0])
        else:
            pass
    else:
        pass

for logrus in pattern.split():
    try:
        key = server.search(hex(int(logrus, 16)))
        hexed = True
```

```

except ValueError as ve:
    key = server.search(logrus)
    hexed = False

if key is not None:
    keys.append(key[0])
    if hexed is True:
        try:
            fob = server.search(logrus)
        except:
            fob = None
        if fob is not None:
            keys.append(fob[0])
    else:
        pass
else:
    pass

if len(keys) > 0:
    for key in keys:
        import_result = c.key_import(key.key_blob)
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print(result)
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scrt = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: {0}

Number of keys revoked: {1}
Number of new signatures: {2}
Number of new subkeys: {3}
Number of new user IDs: {4}
Number of new secret keys: {5}
Number of unchanged keys: {6}

The key IDs for all considered keys were:
""".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scrt,
nochange))

```

```

    for i in range(num_keys):
        print(result.imports[i].fpr)
    print("")
else:
    pass
#+END_SRC

```

Since the hkp4py module handles multiple keys just as effectively as one (=keys= is a list of responses per matching key), the example above is able to do a little bit more with the returned data before anything is actually imported.

```

*** Importing from ProtonMail with HKP for Python
:PROPERTIES:
:CUSTOM_ID: import-protonmail-hkp4py
:END:

```

Though this can provide certain benefits even when working with ProtonMail, the scope is somewhat constrained there due to the limitations of the ProtonMail keyserver.

For instance, searching the SKS keyserver pool for the term "gnupg" produces hundreds of results from any time the word appears in any part of a user ID. Performing the same search on the ProtonMail keyserver returns zero results, even though there are at least two test accounts which include it as part of the username.

The cause of this discrepancy is the deliberate configuration of that server by ProtonMail to require an exact match of the full email address of the ProtonMail user whose key is being requested. Presumably this is intended to reduce breaches of privacy of their users as an email address must already be known before a key for that address can be obtained.

```

**** Import from ProtonMail via HKP for Python Example no. 1
:PROPERTIES:
:CUSTOM_ID: import-hkp4py-pm1
:END:

```

The following script is available with the rest of the examples under the somewhat less than original name, =pmkey-import-hkp.py=.

```

#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path

```

```

import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it.

Usage: pmkey-import-hkp.py [search strings]
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None

if len(sys.argv) > 2:
    keyterms = sys.argv[1:]
elif len(sys.argv) == 2:
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    key_term = input("Enter the key ID, UID or search string: ")
    keyterms = key_term.split()

for keyterm in keyterms:
    if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
    elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
        ksearch.append("{}@protonmail.com".format(keyterm[1:]))
        ksearch.append("{}@protonmail.ch".format(keyterm[1:]))
        ksearch.append("{}@pm.me".format(keyterm[1:]))
    elif keyterm.count("@") == 0:
        ksearch.append("{}@protonmail.com".format(keyterm))
        ksearch.append("{}@protonmail.ch".format(keyterm))
        ksearch.append("{}@pm.me".format(keyterm))
    elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
        uidlist = keyterm.split("@")
        for uid in uidlist:
            ksearch.append("{}@protonmail.com".format(uid))
            ksearch.append("{}@protonmail.ch".format(uid))
            ksearch.append("{}@pm.me".format(uid))
    elif keyterm.count("@") > 2:
        uidlist = keyterm.split("@")

```

```
for uid in uidlist:
    ksearch.append("{0}@protonmail.com".format(uid))
    ksearch.append("{0}@protonmail.ch".format(uid))
    ksearch.append("{0}@pm.me".format(uid))
else:
    ksearch.append(keyterm)
```

```
for k in ksearch:
    print("Checking for key for: {0}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
                try:
                    import_result = c.key_import(key.key_blob)
                except Exception as e:
                    import_result = c.key_import(key.key)
            else:
                paradox.append(keys)
                import_result = None
    except Exception as e:
        import_result = None
    results.append(import_result)
```

```
for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("{0} for {1}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_sctx = result.secret_imported
        nochange = result.unchanged
        print("""
```

The total number of keys considered for import was: {0}

With UIDs wholly or partially matching the following string:

{1}

Number of keys revoked: {2}  
Number of new signatures: {3}  
Number of new subkeys: {4}  
Number of new user IDs: {5}  
Number of new secret keys: {6}

Number of unchanged keys: {7}

The key IDs for all considered keys were:

```
"""format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
         nochange))
    for i in range(num_keys):
        print(result.imports[i].fpr)
    print("")
    elif result is None:
        pass
#+END_SRC
```

\*\*\*\* Import from ProtonMail via HKP for Python Example no. 2

```
:PROPERTIES:
:CUSTOM_ID: import-hkp4py-pm2
:END:
```

Like its counterpart above, this script can also be found with the rest of the examples, by the name pmkey-import-hkp-alt.py.

With this script a modicum of effort has been made to treat anything passed as a =homedir= which either does not exist or which is not a directory, as also being a possible user ID to check for. It's not guaranteed to pick up on all such cases, but it should cover most of them.

```
#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it. Optionally enables specifying a different GnuPG home directory.

Usage: pmkey-import-hkp.py [homedir] [search string]
    or: pmkey-import-hkp.py [search string]
""")
```

```
c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
```

```

homeless = None

if len(sys.argv) > 3:
    homedir = sys.argv[1]
    keyterms = sys.argv[2:]
elif len(sys.argv) == 3:
    homedir = sys.argv[1]
    keyterm = sys.argv[2]
    keyterms.append(keyterm)
elif len(sys.argv) == 2:
    homedir = ""
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    keyterm = input("Enter the key ID, UID or search string: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
    keyterms.append(keyterm)

if len(homedir) == 0:
    homedir = None
    homeless = False

if homedir is not None:
    if homedir.startswith("~"):
        if os.path.exists(os.path.expanduser(homedir)) is True:
            if os.path.isdir(os.path.expanduser(homedir)) is True:
                c.home_dir = os.path.realpath(os.path.expanduser(homedir))
            else:
                homeless = True
        else:
            homeless = True
    elif os.path.exists(os.path.realpath(homedir)) is True:
        if os.path.isdir(os.path.realpath(homedir)) is True:
            c.home_dir = os.path.realpath(homedir)
        else:
            homeless = True
    else:
        homeless = True

# First check to see if the homedir really is a homedir and if not, treat it as
# a search string.
if homeless is True:
    keyterms.append(homedir)
    c.home_dir = None
else:
    pass

for keyterm in keyterms:

```

```

if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
    ksearch.append("{0}@protonmail.com".format(keyterm[1:]))
    ksearch.append("{0}@protonmail.ch".format(keyterm[1:]))
    ksearch.append("{0}@pm.me".format(keyterm[1:]))
elif keyterm.count("@") == 0:
    ksearch.append("{0}@protonmail.com".format(keyterm))
    ksearch.append("{0}@protonmail.ch".format(keyterm))
    ksearch.append("{0}@pm.me".format(keyterm))
elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
elif keyterm.count("@") > 2:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: {0}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
                try:
                    import_result = c.key_import(key.key_blob)
                except Exception as e:
                    import_result = c.key_import(key.key)
            else:
                paradox.append(keys)
                import_result = None
        except Exception as e:
            import_result = None
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("{0} for {1}".format(result.decode(), k))

```

```
elif result is not None and hasattr(result, "considered") is True:
```

```
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scert = result.secret_imported
    nochange = result.unchanged
    print("""
```

The total number of keys considered for import was: {0}

With UIDs wholly or partially matching the following string:

```
{1}
```

```
Number of keys revoked: {2}
Number of new signatures: {3}
Number of new subkeys: {4}
Number of new user IDs: {5}
Number of new secret keys: {6}
Number of unchanged keys: {7}
```

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
          nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
#+END_SRC
```

```
** Exporting keys
:PROPERTIES:
:CUSTOM_ID: howto-export-key
:END:
```

Exporting keys remains a reasonably simple task, but has been separated into three different functions for the OpenPGP cryptographic engine. Two of those functions are for exporting public keys and the third is for exporting secret keys.

```
*** Exporting public keys
:PROPERTIES:
:CUSTOM_ID: howto-export-public-key
:END:
```

There are two methods of exporting public keys, both of which are very similar to the other. The default method, `=key_export()`, will export a public key or keys matching a specified pattern as normal. The alternative, the `=key_export_minimal()` method, will do the same thing except producing a minimised output with extra signatures and third party signatures or certifications removed.

```
#+BEGIN_SRC python -i
import gpg
import os.path
import sys

print("""
This script exports one or more public keys.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export(pattern=logrus)
```

```

except:
    result = c.key_export(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
#+END_SRC

```

It should be noted that the result will only return =None= when a search pattern has been entered, but has not matched any keys. When the search pattern itself is set to =None= this triggers the exporting of the entire public keybox.

```

#+BEGIN_SRC python -i
import gpg
import os.path
import sys

print("""
This script exports one or more public keys in minimised form.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass

```

```

elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_minimal(pattern=logrus)
except:
    result = c.key_export_minimal(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
#+END_SRC

```

```

*** Exporting secret keys
:PROPERTIES:
:CUSTOM_ID: howto-export-secret-key
:END:

```

Exporting secret keys is, functionally, very similar to exporting public keys; save for the invocation of `=pinentry=` via `=gpg-agent=` in order to securely enter the key's passphrase and authorise the export.

The following example exports the secret key to a file which is then set with the same permissions as the output files created by the command line secret key export options.

```

#+BEGIN_SRC python -i
import gpg
import os
import os.path
import sys

print("""
This script exports one or more secret keys.

The gpg-agent and pinentry are invoked to authorise the export.
""")

```

```

c = gpg.Context(armor=True)

```

```

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]

```

```

    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~/"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_secret(pattern=logrus)
except:
    result = c.key_export_secret(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
    os.chmod(keyfile, 0o600)
else:

```

```
pass
#+END_SRC
```

Alternatively the approach of the following script can be used. This longer example saves the exported secret key(s) in files in the GnuPG home directory, in addition to setting the file permissions as only readable and writable by the user. It also exports the secret key(s) twice in order to output both GPG binary (=gpg=) and ASCII armoured (=asc=) files.

```
#+BEGIN_SRC python -i
import gpg
import os
import os.path
import subprocess
import sys

print("""
This script exports one or more secret keys as both ASCII armored and binary
file formats, saved in files within the user's GPG home directory.

The gpg-agent and pinentry are invoked to authorise the export.
""")

if sys.platform == "win32":
    gpgconfgcmd = "gpgconf.exe --list-dirs homedir"
else:
    gpgconfgcmd = "gpgconf --list-dirs homedir"

a = gpg.Context(armor=True)
b = gpg.Context()
c = gpg.Context()

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
```

```

homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

if c.home_dir is not None:
    if c.home_dir.endswith("/"):
        gpgfile = "{0}/{1}.gpg".format(c.home_dir, keyfile)
        ascfile = "{0}/{1}.asc".format(c.home_dir, keyfile)
    else:
        gpgfile = "{0}/{1}.gpg".format(c.home_dir, keyfile)
        ascfile = "{0}/{1}.asc".format(c.home_dir, keyfile)
    else:
        if os.path.exists(os.environ["GNUPGHOME"]) is True:
            hd = os.environ["GNUPGHOME"]
        else:
            try:
                hd = subprocess.getoutput(gpgconfcmd)
            except:
                process = subprocess.Popen(gpgconfcmd.split(),
                                           stdout=subprocess.PIPE)
                procom = process.communicate()
                if sys.version_info[0] == 2:
                    hd = procom[0].strip()
                else:
                    hd = procom[0].decode().strip()
            gpgfile = "{0}/{1}.gpg".format(hd, keyfile)

```

```

ascfile = "{0}/{1}.asc".format(hd, keyfile)

try:
    a_result = a.key_export_secret(pattern=logrus)
    b_result = b.key_export_secret(pattern=logrus)
except:
    a_result = a.key_export_secret(pattern=None)
    b_result = b.key_export_secret(pattern=None)

if a_result is not None:
    with open(ascfile, "wb") as f:
        f.write(a_result)
    os.chmod(ascfile, 0o600)
else:
    pass

if b_result is not None:
    with open(gpgfile, "wb") as f:
        f.write(b_result)
    os.chmod(gpgfile, 0o600)
else:
    pass
#+END_SRC

```

```

*** Sending public keys to the SKS Keyservers
:PROPERTIES:
:CUSTOM_ID: howto-send-public-key
:END:

```

As with the previous section on importing keys, the `hkp4py` module adds another option with exporting keys in order to send them to the public key servers.

The following example demonstrates how this may be done.

```

#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path
import sys

print("""
This script sends one or more public keys to the SKS key servers and is
essentially a slight variation on the export-key.py script.
""")

c = gpg.Context(armor=True)

```

```

server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")

if len(sys.argv) > 2:
    logrus = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    logrus = sys.argv[1]
else:
    logrus = input("Enter the UID matching the key(s) to send: ")

if len(logrus) > 0:
    try:
        export_result = c.key_export(pattern=logrus)
    except Exception as e:
        print(e)
        export_result = None
    else:
        export_result = c.key_export(pattern=None)

if export_result is not None:
    try:
        try:
            send_result = server.add(export_result)
        except:
            send_result = server.add(export_result.decode())
        if send_result is not None:
            print(send_result)
        else:
            pass
    except Exception as e:
        print(e)
    else:
        pass
#+END_SRC

```

An expanded version of this script with additional functions for specifying an alternative homedir location is in the examples directory as =send-key-to-keyserver.py=.

The =hkp4py= module appears to handle both string and byte literal text data equally well, but the GPGME bindings deal primarily with byte literal data only and so this script sends in that format first, then tries the string literal form.

```

* Basic Functions
:PROPERTIES:
:CUSTOM_ID: howto-the-basics
:END:

```

The most frequently called features of any cryptographic library will be the most fundamental tasks for encryption software. In this section we will look at how to programmatically encrypt data, decrypt it, sign it and verify signatures.

#### \*\* Encryption

```
:PROPERTIES:  
:CUSTOM_ID: howto-basic-encryption  
:END:
```

Encrypting is very straight forward. In the first example below the message, =text=, is encrypted to a single recipient's key. In the second example the message will be encrypted to multiple recipients.

#### \*\*\* Encrypting to one key

```
:PROPERTIES:  
:CUSTOM_ID: howto-basic-encryption-single  
:END:
```

Once the the Context is set the main issues with encrypting data is essentially reduced to key selection and the keyword arguments specified in the =gpg.Context().encrypt()= method.

Those keyword arguments are: =recipients=, a list of keys encrypted to (covered in greater detail in the following section); =sign=, whether or not to sign the plaintext data, see subsequent sections on signing and verifying signatures below (defaults to =True=); =sink=, to write results or partial results to a secure sink instead of returning it (defaults to =None=); =passphrase=, only used when utilising symmetric encryption (defaults to =None=); =always\_trust=, used to override the trust model settings for recipient keys (defaults to =False=); =add\_encrypt\_to=, utilises any preconfigured =encrypt-to= or =default-key= settings in the user's =gpg.conf= file (defaults to =False=); =prepare=, prepare for encryption (defaults to =False=); =expect\_sign=, prepare for signing (defaults to =False=); =compress=, compresses the plaintext prior to encryption (defaults to =True=).

```
#+BEGIN_SRC python -i  
import gpg  
  
a_key = "0x12345678DEADBEEF"  
text = b""Some text to test with.
```

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb"

as this is the simplest method of obtaining the correct data format.

```
"""
```

```
c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=False)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
```

```
    afile.write(ciphertext)
```

```
#+END_SRC
```

Though this is even more likely to be used like this; with the plaintext input read from a file, the recipient keys used for encryption regardless of key trust status and the encrypted output also encrypted to any preconfigured keys set in the `=gpg.conf=` file:

```
#+BEGIN_SRC python -i
```

```
import gpg
```

```
a_key = "0x12345678DEADBEEF"
```

```
with open("secret_plans.txt", "rb") as afile:
```

```
    text = afile.read()
```

```
c = gpg.Context(armor=True)
```

```
rkey = list(c.keylist(pattern=a_key, secret=False))
```

```
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=True,
                                           always_trust=True,
                                           add_encrypt_to=True)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
```

```
    afile.write(ciphertext)
```

```
#+END_SRC
```

If the `=recipients=` parameter is empty then the plaintext is encrypted symmetrically. If no `=passphrase=` is supplied as a parameter or via a callback registered with the `=Context()=` then an out-of-band prompt for the passphrase via `pinentry` will be invoked.

```
*** Encrypting to multiple keys
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: howto-basic-encryption-multiple
```

```
:END:
```

Encrypting to multiple keys essentially just expands upon the key selection process and the recipients from the previous examples.

The following example encrypts a message (=text=) to everyone with an email address on the =gnupg.org= domain,[fn:4] but does /not/ encrypt to a default key or other key which is configured to normally encrypt to.

```
#+BEGIN_SRC python -i
import gpg

text = b"""Oh look, another test message.
```

The same rules apply as with the previous example and more likely than not, the message will actually be drawn from reading the contents of a file or, maybe, from entering data at an input() prompt.

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

```
"""

c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []

for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])

ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             sign=False, always_trust=True)

with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
#+END_SRC
```

All it would take to change the above example to sign the message and also encrypt the message to any configured default keys would be to change the =c.encrypt= line to this:

```
#+BEGIN_SRC python -i
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             always_trust=True,
                                             add_encrypt_to=True)
#+END_SRC
```

The only keyword arguments requiring modification are those for which the default values are changing. The default value of =sign= is

=True=, the default of =always\_trust= is =False=, the default of =add\_encrypt\_to= is =False=.

If =always\_trust= is not set to =True= and any of the recipient keys are not trusted (e.g. not signed or locally signed) then the encryption will raise an error. It is possible to mitigate this somewhat with something more like this:

```
#+BEGIN_SRC python -i
import gpg

with open("secret_plans.txt.asc", "rb") as afile:
    text = afile.read()

c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []

for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])

    try:
        ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                                    add_encrypt_to=True)
    except gpg.errors.InvalidRecipients as e:
        for i in range(len(e.recipients)):
            for n in range(len(logrus)):
                if logrus[n].fpr == e.recipients[i].fpr:
                    logrus.remove(logrus[n])
            else:
                pass

    try:
        ciphertext, result, sign_result = c.encrypt(text,
                                                    recipients=logrus,
                                                    add_encrypt_to=True)
        with open("secret_plans.txt.asc", "wb") as afile:
            afile.write(ciphertext)
    except:
        pass
#+END_SRC
```

This will attempt to encrypt to all the keys searched for, then remove invalid recipients if it fails and try again.

```
** Decryption
:PROPERTIES:
```

:CUSTOM\_ID: howto-basic-decryption

:END:

Decrypting something encrypted to a key in one's secret keyring is fairly straight forward.

In this example code, however, preconfiguring either `gpg.Context()` or `gpg.core.Context()` as `c` is unnecessary because there is no need to modify the Context prior to conducting the decryption and since the Context is only used once, setting it to `c` simply adds lines for no gain.

```
#+BEGIN_SRC python -i
import gpg

ciphertext = input("Enter path and filename of encrypted file: ")
newfile = input("Enter path and filename of file to save decrypted data to: ")

with open(ciphertext, "rb") as cfile:
    try:
        plaintext, result, verify_result = gpg.Context().decrypt(cfile)
    except gpg.errors.GPGMEError as e:
        plaintext = None
        print(e)

if plaintext is not None:
    with open(newfile, "wb") as nfile:
        nfile.write(plaintext)
    else:
        pass
#+END_SRC
```

The data available in `plaintext` in this example is the decrypted content as a byte object, the recipient key IDs and algorithms in `result` and the results of verifying any signatures of the data in `verify_result`.

If `gpg.Context().decrypt(cfile, verify=False)` is called instead, then `verify_result` will be returned as `None` and the rest remains as described here.

\*\* Signing text and files

:PROPERTIES:

:CUSTOM\_ID: howto-basic-signing

:END:

The following sections demonstrate how to specify keys to sign with.

\*\*\* Signing key selection

```
:PROPERTIES:  
:CUSTOM_ID: howto-basic-signing-signers  
:END:
```

By default GPGME and the Python bindings will use the default key configured for the user invoking the GPGME API. If there is no default key specified and there is more than one secret key available it may be necessary to specify the key or keys with which to sign messages and files.

```
#+BEGIN_SRC python -i  
import gpg  
  
logrus = input("Enter the email address or string to match signing keys to: ")  
hancock = gpg.Context().keylist(pattern=logrus, secret=True)  
sig_src = list(hancock)  
#+END_SRC
```

The signing examples in the following sections include the explicitly designated `=signers=` parameter in two of the five examples; once where the resulting signature would be ASCII armoured and once where it would not be armoured.

While it would be possible to enter a key ID or fingerprint here to match a specific key, it is not possible to enter two fingerprints and match two keys since the `patten` expects a string, bytes or None and not a list. A string with two fingerprints won't match any single key.

\*\*\* Normal or default signing messages or files

```
:PROPERTIES:  
:CUSTOM_ID: howto-basic-signing-normal  
:END:
```

The normal or default signing process is essentially the same as is most often invoked when also encrypting a message or file. So when the encryption component is not utilised, the result is to produce an encoded and signed output which may or may not be ASCII armoured and which may or may not also be compressed.

By default compression will be used unless GnuPG detects that the plaintext is already compressed. ASCII armouring will be determined according to the value of `=gpg.Context().armor=`.

The compression algorithm is selected in much the same way as the symmetric encryption algorithm or the hash digest algorithm is when multiple keys are involved; from the preferences saved into the key itself or by comparison with the preferences with all other keys involved.

```
#+BEGIN_SRC python -i
import gpg

text0 = """Declaration of ... something.

"""
text = text0.encode()

c = gpg.Context(armor=True, signers=sig_src)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC
```

Though everything in this example is accurate, it is more likely that reading the input data from another file and writing the result to a new file will be performed more like the way it is done in the next example. Even if the output format is ASCII armoured.

```
#+BEGIN_SRC python -i
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)

with open("/path/to/statement.txt.sig", "wb") as afile:
    afile.write(signed_data)
#+END_SRC
```

```
*** Detached signing messages and files
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-detached
:END:
```

Detached signatures will often be needed in programmatic uses of GPGME, either for signing files (e.g. tarballs of code releases) or as a component of message signing (e.g. PGP/MIME encoded email).

```

#+BEGIN_SRC python -i
import gpg

text0 = """Declaration of ... something.

"""

text = text0.encode()

c = gpg.Context(armor=True)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC

```

As with normal signatures, detached signatures are best handled as byte literals, even when the output is ASCII armoured.

```

#+BEGIN_SRC python -i
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context(signers=sig_src)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)

with open("/path/to/statement.txt.sig", "wb") as afile:
    afile.write(signed_data)
#+END_SRC

```

```

*** Clearsigning messages or text
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-clear
:END:

```

Though PGP/in-line messages are no longer encouraged in favour of PGP/MIME, there is still sometimes value in utilising in-line signatures. This is where clear-signed messages or text is of value.

```

#+BEGIN_SRC python -i
import gpg

text0 = """Declaration of ... something.

"""

```

```

text = text0.encode()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC

```

In spite of the appearance of a clear-signed message, the data handled by GPGME in signing it must still be byte literals.

```

#+BEGIN_SRC python -i
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "wb") as afile:
    afile.write(signed_data)
#+END_SRC

```

```

** Signature verification
:PROPERTIES:
:CUSTOM_ID: howto-basic-verification
:END:

```

Essentially there are two principal methods of verification of a signature. The first of these is for use with the normal or default signing method and for clear-signed messages. The second is for use with files and data with detached signatures.

The following example is intended for use with the default signing method where the file was not ASCII armoured:

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
gpg_file = "statement.txt.gpg"

c = gpg.Context()

```

```

try:
    data, result = c.verify(open(gpg_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
    else:
        pass
#+END_SRC

```

Whereas this next example, which is almost identical would work with normal ASCII armoured files and with clear-signed files:

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))

```

```
else:
    pass
#+END_SRC
```

In both of the previous examples it is also possible to compare the original data that was signed against the signed data in `=data=` to see if it matches with something like this:

```
#+BEGIN_SRC python -i
with open(filename, "rb") as afile:
    text = afile.read()
```

```
if text == data:
    print("Good signature.")
else:
    pass
#+END_SRC
```

The following two examples, however, deal with detached signatures. With his method of verification the data that was signed does not get returned since it is already being explicitly referenced in the first argument of `=c.verify=`. So `=data=` is `=None=` and only the information in `=result=` is available.

```
#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
sig_file = "statement.txt.sig"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(sig_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
```

```

        time.ctime(sign.timestamp)))
else:
    pass
#+END_SRC

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
        time.ctime(sign.timestamp)))
else:
    pass
#+END_SRC

```

```

* Creating keys and subkeys
:PROPERTIES:
:CUSTOM_ID: key-generation
:END:

```

The one thing, aside from GnuPG itself, that GPGME depends on, of course, is the keys themselves. So it is necessary to be able to generate them and modify them by adding subkeys, revoking or disabling them, sometimes deleting them and doing the same for user IDs.

In the following examples a key will be created for the world's greatest secret agent, Danger Mouse. Since Danger Mouse is a secret agent he needs to be able to protect information to =SECRET= level

clearance, so his keys will be 3072-bit keys.

The pre-configured `=gpg.conf=` file which sets cipher, digest and other preferences contains the following configuration parameters:

```
#+BEGIN_SRC conf
expert
allow-freeform-uid
allow-secret-key-import
trust-model tofu+pgp
tofu-default-policy unknown
enable-large-rsa
enable-dsa2
cert-digest-algo SHA512
default-preference-list TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1 ZLIB BZIP2 ZIP
Uncompressed
personal-cipher-preferences TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES
personal-digest-preferences SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1
personal-compress-preferences ZLIB BZIP2 ZIP Uncompressed
#+END_SRC
```

```
** Primary key
:PROPERTIES:
:CUSTOM_ID: keygen-primary
:END:
```

Generating a primary key uses the `=create_key=` method in a Context. It contains multiple arguments and keyword arguments, including: `=userid=`, `=algorithm=`, `=expires_in=`, `=expires=`, `=sign=`, `=encrypt=`, `=certify=`, `=authenticate=`, `=passphrase=` and `=force=`. The defaults for all of those except `=userid=`, `=algorithm=`, `=expires_in=`, `=expires=` and `=passphrase=` is `=False=`. The defaults for `=algorithm=` and `=passphrase=` is `=None=`. The default for `=expires_in=` is `=0=`. The default for `=expires=` is `=True=`. There is no default for `=userid=`.

If `=passphrase=` is left as `=None=` then the key will not be generated with a passphrase, if `=passphrase=` is set to a string then that will be the passphrase and if `=passphrase=` is set to `=True=` then `gpg-agent` will launch `pinentry` to prompt for a passphrase. For the sake of convenience, these examples will keep `=passphrase=` set to `=None=`.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
```

```
c.home_dir = "~/gnupg-dm"
userid = "Danger Mouse <dm@secret.example.net>"

dmkey = c.create_key(userid, algorithm="rsa3072", expires_in=31536000,
                    sign=True, certify=True)
#+END_SRC
```

One thing to note here is the use of setting the `c.home_dir` parameter. This enables generating the key or keys in a different location. In this case to keep the new key data created for this example in a separate location rather than adding it to existing and active key store data. As with the default directory, `~/gnupg`, any temporary or separate directory needs the permissions set to only permit access by the directory owner. On posix systems this means setting the directory permissions to 700.

The `temp-homedir-config.py` script in the HOWTO examples directory will create an alternative homedir with these configuration options already set and the correct directory and file permissions.

The successful generation of the key can be confirmed via the returned `GenkeyResult` object, which includes the following data:

```
#+BEGIN_SRC python -i
print("""
Fingerprint: {0}
Primary Key: {1}
Public Key: {2}
Secret Key: {3}
Sub Key: {4}
User IDs: {5}
""".format(dmkey.fpr, dmkey.primary, dmkey.pubkey, dmkey.seckey, dmkey.sub,
          dmkey.uid))
#+END_SRC
```

Alternatively the information can be confirmed using the command line program:

```
#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/gnupg-dm -K
~/gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@secret.example.net>

bash-4.4$
```

```
#+END_SRC
```

As with generating keys manually, to preconfigure expanded preferences for the cipher, digest and compression algorithms, the `=gpg.conf=` file must contain those details in the home directory in which the new key is being generated. I used a cut down version of my own `=gpg.conf=` file in order to be able to generate this:

```
#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm --edit-key 177B7C25DB99745EE2EE13ED026D2F19E99E63AA showpref
quit
Secret key is available.
```

```
sec rsa3072/026D2F19E99E63AA
  created: 2018-03-15 expires: 2019-03-15 usage: SC
  trust: ultimate validity: ultimate
[ultimate] (1). Danger Mouse <dm@secret.example.net>
```

```
[ultimate] (1). Danger Mouse <dm@secret.example.net>
  Cipher: TWOFISH, CAMELLIA256, AES256, CAMELLIA192, AES192, CAMELLIA128, AES, BLOWFISH,
  IDEA, CAST5, 3DES
  Digest: SHA512, SHA384, SHA256, SHA224, RIPEMD160, SHA1
  Compression: ZLIB, BZIP2, ZIP, Uncompressed
  Features: MDC, Keyserver no-modify
```

```
bash-4.4$
#+END_SRC
```

```
** Subkeys
:PROPERTIES:
:CUSTOM_ID: keygen-subkeys
:END:
```

Adding subkeys to a primary key is fairly similar to creating the primary key with the `=create_subkey=` method. Most of the arguments are the same, but not quite all. Instead of the `=userid=` argument there is now a `=key=` argument for selecting which primary key to add the subkey to.

In the following example an encryption subkey will be added to the primary key. Since Danger Mouse is a security conscious secret agent, this subkey will only be valid for about six months, half the length of the primary key.

```
#+BEGIN_SRC python -i
import gpg
```

```

c = gpg.Context()
c.home_dir = "~/gnupg-dm"

key = c.get_key(dmkey.fpr, secret=True)
dmsub = c.create_subkey(key, algorithm="rsa3072", expires_in=15768000,
                        encrypt=True)
#+END_SRC

```

As with the primary key, the results here can be checked with:

```

#+BEGIN_SRC python -i
print("""
Fingerprint: {0}
Primary Key: {1}
Public Key: {2}
Secret Key: {3}
Sub Key: {4}
User IDs: {5}
""".format(dmsub.fpr, dmsub.primary, dmsub.pubkey, dmsub.seckey, dmsub.sub,
           dmsub.uid))
#+END_SRC

```

As well as on the command line with:

```

#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
#+END_SRC

```

```

** User IDs
:PROPERTIES:
:CUSTOM_ID: keygen-uids
:END:

```

```

*** Adding User IDs
:PROPERTIES:
:CUSTOM_ID: keygen-uids-add
:END:

```

By comparison to creating primary keys and subkeys, adding a new user ID to an existing key is much simpler. The method used to do this is `=key_add_uid=` and the only arguments it takes are for the `=key=` and the new `=uid=`.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
c.home_dir = "~/gnupg-dm"

dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
uid = "Danger Mouse <danger.mouse@secret.example.net>"

c.key_add_uid(key, uid)
#+END_SRC
```

Unsurprisingly the result of this is:

```
#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <danger.mouse@secret.example.net>
uid      [ultimate] Danger Mouse <dm@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
#+END_SRC
```

```
*** Revoking User IDs
:PROPERTIES:
:CUSTOM_ID: keygen-uids-revoke
:END:
```

Revoking a user ID is a fairly similar process, except that it uses the `=key_revoke_uid=` method.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
c.home_dir = "~/gnupg-dm"
```

```
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"  
key = c.get_key(dmfpr, secret=True)  
uid = "Danger Mouse <danger.mouse@secret.example.net>"
```

```
c.key_revoke_uid(key, uid)  
#+END_SRC
```

```
** Key certification  
:PROPERTIES:  
:CUSTOM_ID: key-sign  
:END:
```

Since key certification is more frequently referred to as key signing, the method used to perform this function is `key_sign`.

The `key_sign` method takes four arguments: `key`, `uids`, `expires_in` and `local`. The default value of `uids` is `None` and which results in all user IDs being selected. The default value of both `expires_in` and `local` is `False`; which results in the signature never expiring and being able to be exported.

The `key` is the key being signed rather than the key doing the signing. To change the key doing the signing refer to the signing key selection above for signing messages and files.

If the `uids` value is not `None` then it must either be a string to match a single user ID or a list of strings to match multiple user IDs. In this case the matching of those strings must be precise and it is case sensitive.

To sign Danger Mouse's key for just the initial user ID with a signature which will last a little over a month, do this:

```
#+BEGIN_SRC python -i  
import gpg  
  
c = gpg.Context()  
uid = "Danger Mouse <dm@secret.example.net>"  
  
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"  
key = c.get_key(dmfpr, secret=True)  
c.key_sign(key, uids=uid, expires_in=2764800)  
#+END_SRC
```

```
*** Verifying key certifications  
:PROPERTIES:
```

```
:CUSTOM_ID: key-sign-verify
```

```
:END:
```

```
#+BEGIN_SRC python -i
import gpg
import time

c = gpg.Context()
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

for user in key.uids:
    for sig in user.signatures:
        print("0x{0}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
#+END_SRC
```

Which for Danger Mouse displays the following:

```
#+BEGIN_EXAMPLE
0x92E3F6115435C65A Thu Mar 15 13:17:44 2018 Danger Mouse <dm@secret.example.net>
0x321E4E2373590E5D Mon Nov 26 12:46:05 2018 Ben McGinnes <ben@adversary.org>
#+END_EXAMPLE
```

The two key signatures listed are for the self-certification of Danger Mouse's key made when the key was created in March, 2018; and the second is a signature made by the author and set to expire at the end of the year. Note that the second signature was made with the following code (including the preceding code to display the output of the certifications or key signatures):

```
#+BEGIN_SRC python -i
import gpg
import math
import pendulum
import time

hd = "/home/dm/.gnupg"
c = gpg.Context()
d = gpg.Context(home_dir=hd)
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
dmuid = "Danger Mouse <dm@secret.example.net>"
dkeys = list(c.keylist(pattern=dmuid))
dmkey = dkeys[0]

c.key_import(d.key_export(pattern=None))
```

```

tp = pendulum.period(pendulum.now(tz="local"), pendulum.datetime(2019, 1, 1))
ts = tp.total_seconds()
total_secs = math.ceil(ts)
c.key_sign(dmkey, uids=dmuid, expires_in=total_secs)

d.key_import(c.key_export(pattern=dmuid))
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

for user in key.uids:
    for sig in user.signatures:
        print("0x{0}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
#+END_SRC

```

Note that this final code block includes the use of a module which is /not/ part of Python's standard library, the [\[\[https://pendulum.eustace.io/\]\[pendulum module\]\]](https://pendulum.eustace.io/). Unlike the standard datetime module, pendulum makes working with dates and times significantly easier in Python; just as the requests module makes working with HTTP and HTTPS easier than the builtin modules do.

Though neither requests nor pendulum are required modules for using the GPGME Python bindings, they are both highly recommended more generally.

\* Advanced or Experimental Use Cases

```

:PROPERTIES:
:CUSTOM_ID: advanced-use
:END:

```

\*\* C plus Python plus SWIG plus Cython

```

:PROPERTIES:
:CUSTOM_ID: cython
:END:

```

In spite of the apparent incongruence of using Python bindings to a C interface only to generate more C from the Python; it is in fact quite possible to use the GPGME bindings with [\[\[http://docs.cython.org/en/latest/index.html\]\[Cython\]\]](http://docs.cython.org/en/latest/index.html). Though in many cases

the benefits may not be obvious since the most computationally intensive work never leaves the level of the C code with which GPGME itself is interacting with.

Nevertheless, there are some situations where the benefits are demonstrable. One of the better and easier examples being the one of the early examples in this HOWTO, the [\[\[#howto-keys-counting\]\[key counting\]\]](#) code. Running that

example as an executable Python script, `=keycount.py=` (available in the `=examples/howto/=` directory), will take a noticeable amount of time to run on most systems where the public keybox or keyring contains a few thousand public keys.

Earlier in the evening, prior to starting this section, I ran that script on my laptop; as I tend to do periodically and timed it using `=time=` utility, with the following results:

```
#+BEGIN_SRC shell
bash-4.4$ time keycount.py
```

```
Number of secret keys: 23
Number of public keys: 12112
```

```
real 11m52.945s
user 0m0.913s
sys 0m0.752s
```

```
bash-4.4$
#+END_SRC
```

Sometime after that I imported another key and followed it with a little test of Cython. This test was kept fairly basic, essentially lifting the material from the [\[\[http://docs.cython.org/en/latest/src/tutorial/cython\\_tutorial.html\]\]](http://docs.cython.org/en/latest/src/tutorial/cython_tutorial.html) [Cython Basic Tutorial] to demonstrate compiling Python code to C. The first step was to take the example key counting code quoted previously, essentially from the importing of the `=gpg=` module to the end of the script:

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
seckey = c.keylist(pattern=None, secret=True)
pubkey = c.keylist(pattern=None, secret=False)

seclist = list(seckey)
secnum = len(seclist)

publist = list(pubkey)
pubnum = len(publist)

print("""
Number of secret keys: {0}
Number of public keys: {1}

```

```
""".format(secnum, pubnum))
#+END_SRC
```

Save that into a file called `=keycount.pyx=` and then create a `=setup.py=` file which contains this:

```
#+BEGIN_SRC python -i
from distutils.core import setup
from Cython.Build import cythonize

setup(
    ext_modules = cythonize("keycount.pyx")
)
#+END_SRC
```

Compile it:

```
#+BEGIN_SRC shell
bash-4.4$ python setup.py build_ext --inplace
bash-4.4$
#+END_SRC
```

Then run it in a similar manner to `=keycount.py=`:

```
#+BEGIN_SRC shell
bash-4.4$ time python3.7 -c "import keycount"
```

```
Number of secret keys: 23
Number of public keys: 12113
```

```
real 6m47.905s
user 0m0.785s
sys 0m0.331s
```

```
bash-4.4$
#+END_SRC
```

Cython turned `=keycount.pyx=` into an 81KB `=keycount.o=` file in the `=build/=` directory, a 24KB `=keycount.cpython-37m-darwin.so=` file to be imported into Python 3.7 and a 113KB `=keycount.c=` generated C source code file of nearly three thousand lines. Quite a bit bigger than the 314 bytes of the `=keycount.pyx=` file or the full 1,452 bytes of the full executable `=keycount.py=` example script.

On the other hand it ran in nearly half the time; taking 6 minutes and 47.905 seconds to run. As opposed to the 11 minutes and 52.945 seconds which the CPython script alone took.

The `=keycount.pyx=` and `=setup.py=` files used to generate this example have been added to the `=examples/howto/advanced/cython/=` directory. The example versions include some additional options to annotate the existing code and to detect Cython's use. The latter comes from the [\[\[http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd\]\]](http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd) `[[Magic Attributes]]` section of the Cython documentation.

\* Miscellaneous extras and work-arounds

```
:PROPERTIES:  
:CUSTOM_ID: cheats-and-hacks  
:END:
```

Most of the things in the following sections are here simply because there was no better place to put them, even though some are only peripherally related to the GPGME Python bindings. Some are also workarounds for functions not integrated with GPGME as yet. This is especially true of the first of these, dealing with `[[#group-lines]]` `[[group lines]]`.

\*\* Group lines

```
:PROPERTIES:  
:CUSTOM_ID: group-lines  
:END:
```

There is not yet an easy way to access groups configured in the `gpg.conf` file from within GPGME. As a consequence these central groupings of keys cannot be shared amongst multiple programs, such as MUAs readily.

The following code, however, provides a work-around for obtaining this information in Python.

```
#+BEGIN_SRC python -i  
import subprocess  
import sys  
  
if sys.platform == "win32":  
    gpgconfgcmd = "gpgconf.exe --list-options gpg"  
else:  
    gpgconfgcmd = "gpgconf --list-options gpg"  
  
process = subprocess.Popen(gpgconfgcmd.split(), stdout=subprocess.PIPE)  
procom = process.communicate()  
  
if sys.version_info[0] == 2:  
    lines = procom[0].splitlines()
```

```

else:
    lines = procom[0].decode().splitlines()

for line in lines:
    if line.startswith("group") is True:
        break

groups = line.split(":-1].replace("'", ").split(',')

group_lines = []
group_lists = []

for group in groups:
    group_lines.append(group.split("="))
    group_lists.append(group.split("="))

for glist in group_lists:
    glist[1] = glist[1].split()
#+END_SRC

```

The result of that code is that `group_lines` is a list of lists where `group_lines[i][0]` is the name of the group and `group_lines[i][1]` is the key IDs of the group as a string.

The `group_lists` result is very similar in that it is a list of lists. The first part, `group_lists[i][0]` matches `group_lines[i][0]` as the name of the group, but `group_lists[i][1]` is the key IDs of the group as a list.

A demonstration of using the `groups.py` module is also available in the form of the executable `mutt-groups.py` script. This second script reads all the group entries in a user's `pgp.conf` file and converts them into crypt-hooks suitable for use with the Mutt and Neomutt mail clients.

```

** Keyserver access for Python
:PROPERTIES:
:CUSTOM_ID: hkp4py
:END:

```

The <https://github.com/Selfnet/hkp4py> module by Marcel Fest was originally a port of the old <https://github.com/dgladkov/python-hkp> module from Python 2 to Python 3 and updated to use the <http://docs.python-requests.org/en/latest/index.html> module instead. It has since been modified to provide support for Python 2.7 as well and is available via PyPI.

Since it rewrites the `hkp` protocol prefix as `http` and `hkps` as

=https=, the module is able to be used even with servers which do not support the full scope of keyserver functions.[fn:5] It also works quite readily when incorporated into a [[#cython][Cython]] generated and compiled version of any code.

```
*** Key import format
:PROPERTIES:
:CUSTOM_ID: hkp4py-strings
:END:
```

The hkp4py module returns key data via requests as string literals (=r.text=) instead of byte literals (=r.content=). This means that the returned key data must be encoded to UTF-8 when importing that key material using a =gpg.Context().key\_import(= method.

For this reason an alternative method has been added to the =search= function of =hkp4py.KeyServer(= which returns the key in the correct format as expected by =key\_import=. When importing using this module, it is now possible to import with this:

```
#+BEGIN_SRC python -i
for key in keys:
    if key.revoked is False:
        gpg.Context().key_import(key.key_blob)
    else:
        pass
#+END_SRC
```

Without that recent addition it would have been necessary to encode the contents of each =hkp4py.KeyServer().search()[i].key= in =hkp4py.KeyServer().search(= before trying to import it.

An example of this is included in the [[#howto-import-key][Importing Keys]] section of this HOWTO and the corresponding executable version of that example is available in the =lang/python/examples/howto= directory as normal; the executable version is the =import-keys-hkp.py= file.

```
** GPGME version checking
:PROPERTIES:
:CUSTOM_ID: gpgme-version-check
:END:
```

For various reasons it may be necessary to check which version of GPGME the bindings have been built against; including whether a minimum required version of GPGME is in use.

For the most part the `gpg.version.versionstr` and `gpg.version.versionlist` methods have been quite sufficient. The former returns the same string as `gpgme-config --version`, while the latter returns the major, minor and patch values in a list.

To check if the installed bindings have actually been built against the current installed libgpgme version, this check can be performed:

```
#+BEGIN_SRC python -i
import gpg
import subprocess
import sys

gpgme_version_call = subprocess.Popen(["gpgme-config", "--version"],
                                       stdout=subprocess.PIPE,
                                       stderr=subprocess.PIPE)
gpgme_version_str = gpgme_version_call.communicate()

if sys.version_info[0] == 2:
    gpgme_version = gpgme_version_str[0].strip()
elif sys.version_info[0] >= 3:
    gpgme_version = gpgme_version_str[0].decode().strip()
else:
    gpgme_version = None

if gpgme_version is not None:
    if gpgme_version == gpg.version.versionstr:
        print("The GPGME Python bindings match libgpgme.")
    else:
        print("The GPGME Python bindings do NOT match libgpgme.")
else:
    print("Upgrade Python and reinstall the GPGME Python bindings.")
#+END_SRC
```

For many developers, however, the preferred checking means checking for a minimum version or point release. This is now readily available via the `gpg.version.versionintlist` method (added in version `1.12.1-beta79`). It is also now possible to easily check whether the installed GPGME Python bindings were built from a development or beta branch of the GPGME source code.

The following code demonstrates how both of those methods may be used:

```
#+BEGIN_SRC python -i
import gpg

try:
    if gpg.version.is_beta is True:
```

```

    print("The installed GPGME Python bindings were built from beta code.")
else:
    print("The installed GPGME Python bindings are a released version.")
except Exception as e:
    print(e)

try:
    if gpg.version.versionintlist[0] == 1:
        if gpg.version.versionintlist[1] == 12:
            if gpg.version.versionintlist[2] == 1:
                print("This is the minimum version for using versionintlist.")
            elif gpg.version.versionintlist[2] > 1:
                print("The versionintlist method is available.")
            else:
                pass
        elif gpg.version.versionintlist[1] > 12:
            print("The versionintlist method is available.")
        else:
            pass
    elif gpg.version.versionintlist[0] > 1:
        print("The versionintlist method is available.")
    else:
        pass
except Exception as e:
    print(e)
#+END_SRC

```

The points where `=pass=` is used in the above example will most likely also produce an `=Exception=` error since those results should only occur in versions which do not have the `=gpgme.version.is_beta=` and `=gpgme.version.versionintlist=` methods available.

```

* Copyright and Licensing
:PROPERTIES:
:CUSTOM_ID: copyright-and-license
:END:

```

```

** Copyright
:PROPERTIES:
:CUSTOM_ID: copyright
:END:

```

Copyright The GnuPG Project, 2018.

```

** Draft Editions of this HOWTO

```

```
:PROPERTIES:  
:CUSTOM_ID: draft-editions  
:END:
```

Draft editions of this HOWTO may be periodically available directly from the author at any of the following URLs:

- <https://files.au.adversary.org/crypto/gpgme-python-howto.html> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)]
- <http://files.au.adversary.org/crypto/gpgme-python-howto.html> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)]
- <https://files.au.adversary.org/crypto/gpgme-python-howto-split/index.html> [GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 SSL)]
- <http://files.au.adversary.org/crypto/gpgme-python-howto/index.html> [GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 no SSL)]

These draft versions have been generated from this document via GNU Emacs <https://orgmode.org/> [Org mode] to =.texi= and <https://www.gnu.org/software/texinfo/> [GNU Texinfo] to HTML. Though it is likely that the specific <https://files.au.adversary.org/crypto/gpgme-python-howto/> [file] <http://files.au.adversary.org/crypto/gpgme-python-howto.org/> [version] used will be on the same server with the generated output formats. Occasionally I may include the Org mode generated XHTML versions:

- <https://files.au.adversary.org/crypto/gpgme-python-howto.xhtml> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)]
- <http://files.au.adversary.org/crypto/gpgme-python-howto.xhtml> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)]

That XHTML version, however, is exported in a way which inherits a colour scheme from <https://github.com/holomorph/emacs-zenburn> [the author's Emacs theme] (which is a higher contrast version of <http://kippura.org/zenburnpage/> [Zenburn] ported by <https://github.com/holomorph> [Holomorph]). So it's fine for people who prefer dark themed web pages, but not so great for everyone else.

The GNU Texinfo and reStructured Text versions ship with the software, while the GNU Emacs Info version is generated from the Texinfo version using GNU Texinfo or GNU Makeinfo. The Texinfo format is generated from the original Org mode source file in Org mode itself either within GNU Emacs or via the command line by invoking Emacs in batch mode:

```
#+BEGIN_SRC shell  
emacs gpgme-python-howto.org --batch -f org-texinfo-export-to-texinfo --kill  
emacs gpgme-python-howto --batch -f org-texinfo-export-to-texinfo --kill  
#+END_SRC
```

The reStructuredText format is also generated from the Org mode source file, except it is generated using [\[\[https://pandoc.org\]\]](https://pandoc.org)[[Pandoc]] with either of the following commands (depending on the filename):

```
#+BEGIN_SRC shell
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto.org
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto
#+END_SRC
```

Note that the Org mode source files are identified as such via a mode line at the top of each file and have had their `.org` file extensions dropped in order to make scripted generation of output formats easier and not require renaming files post-conversion.

Due to a bug in Org mode's texinfo conversion method, the recommended steps for generating the Texinfo files for all the files in the `=lang/python/doc/src/=` directory are as follows:

```
#+BEGIN_SRC shell
for x in * ; do
    emacs $x --batch -f org-texinfo-export-to-texinfo --kill
    cat $x.texi | sed -e 's/@documentencoding UTF-8/@documentencoding utf-8/g' > ../texinfo/$x.texi
    pandoc -f org -t rst+smart -o ../rst/$x.rst $x
done ;
rm -fv *.texi
cd ../texinfo
mkdir info
mkdir html
for x in *.texi ; do
    makeinfo -v $x
    makeinfo --html --no-split $x
done ;
mv *.info info/
mv *.html html/
#+END_SRC
```

This code snippet includes the generation of the reStructuredText files and would be expected to be run from the `=doc/src/=` directory containing the Org mode source files. It also assumes that the commands are being run on POSIX compliant systems with basic tools like sed, the Bourne shell and GNU Emacs<sup>[fn:6]</sup> available. The code snippet also includes the steps for generating the Emacs Info files and HTML files from the Texinfo files. Using reStructuredText files with Sphinx is best left for the documentation of that project.

In addition to these there is a significantly less frequently updated version as a HTML [\[\[https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html\]\]](https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html)[[WebHelp site]] (AWS S3 SSL); generated from DITA XML

source files, which can be found in <https://dev.gnupg.org/source/gpgme/browse/ben%252Fhowto-dita/> [an alternative branch] of the GPGME git repository.

Various generated output formats may occasionally be found in subdirectories of the <https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/> [gpgme-python] directory. In particular within the <https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita/> [DITA], <https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst/> [reStructuredText] and <https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo/> [Texinfo] subdirectories. The =rst= directory contains output files generated with Sphinx and may include a considerable number of its possible output formats, but there are no guarantees as to how recent these are or even if they are present.

These draft editions are not official documents and the version of documentation in the master branch or which ships with released versions is the only official documentation. Nevertheless, these draft editions may occasionally be of use by providing more accessible web versions which are updated between releases. They are provided on the understanding that they may contain errors or may contain content subject to change prior to an official release.

\*\* License GPL compatible

:PROPERTIES:

:CUSTOM\_ID: license

:END:

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\* Footnotes

[fn:1] =short-history= and/or =short-history.html=.

[fn:2] With no issues reported specific to Python 3.7, the release of Python 3.7.1 at around the same time as GPGME 1.12.0 and the testing with Python 3.7.1rc1, there is no reason to delay moving 3.7 ahead of 3.6 now. Production environments with more conservative requirements will always enforce their own policies anyway and installation to each

supported minor release is quite possible too.

[fn:3] Yes, even if you use virtualenv with everything you do in Python. If you want to install this module as just your user account then you will need to manually configure, compile and install the /entire/ GnuPG stack as that user as well. This includes libraries which are not often installed that way. It can be done and there are circumstances under which it is worthwhile, but generally only on POSIX systems which utilise single user mode (some even require it).

[fn:4] You probably don't really want to do this. Searching the key servers for "gnupg.org" produces over 400 results, the majority of which aren't actually at the gnupg.org domain, but just included a comment regarding the project in their key somewhere.

[fn:5] Such as with ProtonMail servers. This also means that restricted servers which only advertise either HTTP or HTTPS end points and not HKP or HKPS end points must still be identified as HKP or HKPS within the Python Code. The =hkp4py= module will rewrite these appropriately when the connection is made to the server.

[fn:6] Okay, Emacs might not necessarily qualify as a basic tool, but it is common enough that having it installed on a system isn't too great an expectation, nor is it difficult to add to most POSIX systems, even if the users of those systems do not personally use it.

```
;; -*- Mode: lisp -*-
```

```
;; Copyright (C) 2006 g10 Code GmbH
```

```
;;
```

```
;; This file is part of GPGME.
```

```
;;
```

```
;; GPGME is free software; you can redistribute it and/or
```

```
;; modify it under the terms of the GNU Lesser General Public License
```

```
;; as published by the Free Software Foundation; either version 2.1 of
```

```
;; the License, or (at your option) any later version.
```

```
;;
```

```
;; GPGME is distributed in the hope that it will be useful, but
```

```
;; WITHOUT ANY WARRANTY; without even the implied warranty of
```

```
;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
```

```
;; Lesser General Public License for more details.
```

```
;;
```

```
;; You should have received a copy of the GNU Lesser General Public
```

```
;; License along with GPGME; if not, write to the Free
```

```
;; Software Foundation, Inc., 59 Temple Place - Suite 330, Boston, MA
```

```
;; 02111-1307, USA.
```

```
(defpackage #:gpgme-system
```

```
  (:use #:common-lisp #:asdf))
```

```
(in-package #:gpgme-system)
```

```
(defsystem gpgme
  :description "GnuPG Made Easy."
  :author "g10 Code GmbH"
  :version "1.13.1"
  :licence "GPL"
  :defsystem-depends-on ("cffi-grovel")
  :depends-on ("cffi" "gpg-error" "trivial-garbage")
  :components ((:file "gpgme-package")
               (:cffi-grovel-file "gpgme-grovel"
                :depends-on ("gpgme-package")))
               (:file "gpgme"
                :depends-on ("gpgme-package" "gpgme-grovel"))))
cython
(21:protected-private-key(3:dsa(1:p129:_d8|po3s@!WGUOAXRC$_[8SN:y|o?2[,pVxn(kOc\Bk0zu&FnK)(1:q21:
vBeOP\)(1:g129:fU/e(2hp@hjc2uE=Sg GO;ZkIyFnGM!GsG@
= _SZkII)(1:y128:K:9tA]4SU1 }sG`nZpx/imV^>A;V%?5!!s{!=-6@|
=d
)(9:protected25:openpgp-s2k3-sha1-aes-cbc((4:sha18:Li7:6452224)16:,kO{,}80:z7OCG/sB48(H9%*ojSO
OGSma`YUs1h<_)(12:protected-at15:20130812T105134)))
#+TITLE: GPGME Python Bindings HOWTO Examples
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}
```

\* Examples

```
:PROPERTIES:
:CUSTOM_ID: gpgme-python3-examples
:END:
```

The contents of this directory are the examples included in the /GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO/ file. Each script is explicitly for Python 3 and specifically for Python 3.4 or later.

Some of these scripts may work with Python 2.7, but there are no guarantees. They will include the relevant imports from the `=_future_=` module to facilitate that if possible.

\* Copyright and Licensing

```
:PROPERTIES:
:CUSTOM_ID: copyright-and-license
:END:
```

Unless otherwise stated, all the examples in this directory are released under the same terms as GPGME itself; that is they are dual licensed under the terms of both the GNU General Public License version 2.0 (or any later version) \*and\* the GNU Lesser General Public License version 2.1 (or any later version).

\*\* Copyright (C) The GnuPG Project, 2018

```
:PROPERTIES:
:CUSTOM_ID: copyright
:END:
```

Copyright The GnuPG Project, 2018.

\*\* License GPL compatible

```
:PROPERTIES:
:CUSTOM_ID: license
:END:
```

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This file is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, to the extent permitted by law; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

```
\input texinfo @c -*- texinfo -*-
@c %**start of header
@setfilename index.info
@settitle GNU Privacy Guard (GnuPG) Made Easy Python Bindings
@documentencoding utf-8
@documentlanguage en
@c %**end of header

@finalout
@titlepage
@title GNU Privacy Guard (GnuPG) Made Easy Python Bindings
@author Ben McGinnes
@end titlepage

@contents
```

@ifnottex  
@node Top  
@top GNU Privacy Guard (GnuPG) Made Easy Python Bindings  
@end ifnottex

@menu  
\* GPGME Python Bindings::

@detailmenu  
--- The Detailed Node Listing ---

GPGME Python Bindings

\* Contents::

@end detailmenu  
@end menu

@node GPGME Python Bindings  
@chapter GPGME Python Bindings

@menu  
\* Contents::  
@end menu

@node Contents  
@section Contents

@itemize  
@item  
@uref{short-history, A short history of the project}  
@item  
@uref{what-is-new, What's New}  
@itemize  
@item  
@uref{maintenance-mode, Maintenance Mode} (from January, 2019)  
@end itemize  
@item  
@uref{what-was-new, What Was New}  
@item  
@uref{gpgme-python-howto, GPGME Python Bindings HOWTO}  
@end itemize

@bye  
;;; gpgme-package.lisp

;;; Copyright (C) 2006 g10 Code GmbH  
;;;

```
;;; This file is part of GPGME-CL.  
;;;  
;;; GPGME-CL is free software; you can redistribute it and/or modify  
;;; it under the terms of the GNU General Public License as published  
;;; by the Free Software Foundation; either version 2 of the License,  
;;; or (at your option) any later version.  
;;;  
;;; GPGME-CL is distributed in the hope that it will be useful, but  
;;; WITHOUT ANY WARRANTY; without even the implied warranty of  
;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
;;; Lesser General Public License for more details.  
;;;  
;;; You should have received a copy of the GNU General Public License  
;;; along with GPGME; if not, write to the Free Software Foundation,  
;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.  
  
;;; Conventions:  
;;;  
;;; gpg-error is used for error handling.  
;;;  
;;; Standard I/O streams are used for input and output.
```

```
(defpackage #:gpgme  
  (:use #:common-lisp #:cffi #:gpg-error)  
  (:import-from #:trivial-garbage  
    #:finalize)  
  (:export #:check-version  
    #:*version*  
    #:context  
    #:protocol  
    #:armorp  
    #:textmodep  
    #:+include-certs-default+  
    #:include-certs  
    #:keylist-mode  
    #:signers  
    #:sig-notations  
    #:with-context  
    #:key-data  
    #:get-key  
    #:op-encrypt  
    #:op-decrypt  
    #:op-sign  
    #:op-verify  
    #:op-import  
    #:op-export))  
2011-12-02 Werner Koch <wk@g10code.com>
```

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-05-12 Marcus Brinkmann <marcus@g10code.com>

\* gpgme.texi (I/O Callback Example): Fix example code.

\* gpgme.texi (Generating Keys): Fix OpenPGP parameters and reference GPG and GPGSM manual.

2010-01-05 Werner Koch <wk@g10code.com>

\* gpgme.texi (Changing Passphrases): New.

2009-07-21 Werner Koch <wk@g10code.com>

\* uiserver.texi (UI Server Encrypt): Add --expect-sign option to PREP\_ENCRYPT.

2009-06-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Result Management): New section.

2009-06-16 Werner Koch <wk@g10code.com>

\* gpgme.texi (Exporting Keys): Document gpgme\_op\_export\_keys.  
(Importing Keys): Document gpgme\_op\_import\_keys.  
(Data Buffer Meta-Data): Document URL encodings.

2009-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Document selftest error.  
(Creating Contexts): Likewise.

2009-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Information): Replace path by file\_name.

2008-11-28 Werner Koch <wk@g10code.com>

\* gpgme.texi (Listing Keys): Change description of the return

value to match the code. Spotted by Colin Leroy.

2008-10-15 Werner Koch <wk@g10code.com>

\* uiserver.texi (Miscellaneous UI Server Commands): Add option --protocol to the SENDER command.

2008-07-17 Werner Koch <wk@g10code.com>

\* module-overview.sk: New.

2008-07-04 Werner Koch <wk@g10code.com>

\* gpgme.texi (Algorithms): Add a hint on symmetric only encryption.

2008-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Cancellation): Document gpgme\_cancel\_async.

2008-06-25 Werner Koch <wk@g10code.com>

\* gpgme.texi (Listing Keys): Updated example to the current API. Noted by Nico Schottelius.

2008-06-05 Werner Koch <wk@g10code.com>

\* uiserver.texi (Miscellaneous UI Server Commands): Describe START\_CONFDialog.

2008-06-04 Werner Koch <wk@g10code.com>

\* gpgme.texi: Use @copying command. Change license to GPLv3. Include protocol specs from GpgOL and GPGEEx. Minor cleanups.

2008-03-11 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (File Based Data Buffers): Document the need for blocking operations. (Callback Based Data Buffers): Likewise.

2008-03-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Rename snippet function to init\_gpgme. (I/O Callback Example): Call it here.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Document that data encoding affects some output data objects now.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Protocols and Engines): Document GPGME\_PROTOCOL\_UNKNOWN.

2007-09-11 Werner Koch <wk@g10code.com>

\* gpgme.texi (I/O Callback Example): Typo fix.

2007-08-07 Werner Koch <wk@g10code.com>

\* gpgme.texi (Verify): Describe chain\_model.

2007-07-12 Werner Koch <wk@g10code.com>

\* gpgme.texi (Library Version Check): Add remark that the socket layer will get initialized.

2007-06-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Advanced Key Editing): New section.

2007-05-21 Werner Koch <wk@g10code.com>

\* Makefile.am (online): New target.

2007-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Fix documentation of gpgme\_strerror\_r.

2006-11-01 Moritz Schulte <moritz@g10code.com>

\* gpgme.texi (Data Buffer I/O Operations): Fixed entry for gpgme\_data\_seek: OFFSET is not a pointer; some s/whence/offset/.

2006-09-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Destroying Data Buffers): Clarify that gpgme\_data\_release\_and\_get\_mem destroys DH unconditionally.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Make example code compatible to W32 systems.

2006-06-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix inverted condition in description.

2005-12-20 Werner Koch <wk@g10code.com>

\* gpgme.texi (Verify): Document pka\_trust.

2005-12-06 Werner Koch <wk@g10code.com>

\* gpgme.texi (Key Management): Updated to match the fixes for subkey fingerprints and theg secret flag.

2005-10-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Destroying Data Buffers): Document gpgme\_free.

2005-10-02 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Add the new member notations of gpgme\_sig\_key\_t.  
(Key Listing Mode): Document GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Enclose all return parameters of dectypes in curly brackets.

\* gpgme.texi (Signature Notation Data): New section.  
(Verify): Added more about the notation data structure.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Data Buffer I/O Operations, Data Buffer Meta-Data):  
New subsections.

\* gpgme.texi: Replace plaintext\_filename with file\_name.

\* gpgme.texi (Key Management): Document is\_qualified.

2005-07-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Decrypt): Add plaintext\_filename to gpgme\_decrypt\_result\_t.  
(Verify): Likewise for gpgme\_verify\_result\_t.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Add information about new fields in  
gpgme\_signature\_t.

\* gpgme.texi (Decrypt): Add gpgme\_recipient\_t.

2005-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Fix return type of  
gpgme\_set\_keylist\_mode.

Reported by "Sergio" <ml\_sergico@virgilio.it>.

2005-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Included Certificates): Document  
GPGME\_INCLUDE\_CERTS\_DEFAULT.

2005-01-12 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Configuration): New section.  
(Crypto Engine): New subsection.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* lesser.texi (Library Copying): Change from @appendixsec to  
@appendix.

\* gpgme.texi (Features): Change reference to GPL to one to LGPL.

\* Makefile.am: Change license to LGPL.

(gpgme\_TEXINFOS): Replace gpl.texi with lesser.texi.

\* gpgme.texi: Change license to LGPL (also for documentation of  
GPGME's license).

\* lesser.texi: New file.

\* gpl.texi: File removed.

\* gpgme.texi (Creating Contexts): Fix cut&paste error. Reported  
by Noel Torres <envite@rolamasao.org>.

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (gpgme\_TEXINFOS): Remove fdl.texi.

\* gpgme.texi: Do not include fdl.texi. Change license to GPL.

\* fdl.texi: File removed.

2004-09-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Change type of keylist\_mode in gpgme\_key\_t to gpgme\_keylist\_mode\_t.

2004-09-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix last change.

2004-09-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Document GPG\_ERR\_NOT\_IMPLEMENTED.

\* gpgme.texi: Update copyright year for tex version.

2004-07-29 Moritz Schulte <moritz@g10code.com>

\* gpgme.texi (Verify): Fix gpgme\_get\_key example (ancient force\_update argument was still there).

2004-06-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Elaborate on the length restrictions on search patterns.

\* gpgme.texi (Decrypt and Verify): Document the NO\_DATA error code.

(Verify): Document the relationship between gpgme\_op\_verify\_result and the decrypt and verify operations.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Document GPG\_ERR\_CERT\_REVOKED status.

\* gpgme.texi (Decrypt): Add note about new field wrong\_key\_usage of gpgme\_decrypt\_result\_t.

\* gpgme.texi (Key Management): Add note about new field keylist\_mode of gpgme\_key\_t.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Correct type of member wrong\_key\_usage.

2004-03-29 Moritz Schulte <moritz@duesseldorf.ccc.de>

\* gpgme.texi (Verify): Fix type of gpgme\_op\_verify\_result.

\* gpgme.texi (Key Listing Mode): Typo fix.

2004-03-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Fix the instruction when to set the locale.

2004-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (I/O Callback Example Qt): New section by Marc Mutz.

2004-02-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (cancellation): New section.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Key Listing Mode): Doc KEYLIST\_MODE\_VALIDATE.

2004-02-06 Moritz Schulte <mo@g10code.com>

\* gpgme.texi: A couple of small fixes regarding the Largfile Support section.

2004-02-01 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Largefile Support): New section.

2004-01-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Fix exportable field.

2003-12-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Rename member class in gpgme\_key\_sig\_t to sig\_class.

(Creating a Signature): Likewise for gpgme\_signature\_t.

2003-12-23 Moritz Schulte <mo@g10code.com>

\* gpgme.texi (Listing Keys): Minor clarification for gpgme\_get\_key.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Signal Handling): New section.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Correct documentation on memory

synchronization requirement.

\* gpgme.texi (Locale): New section.  
(Multi Threading): Set locale in example.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Add gpgme\_strerror\_r.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Update documentation.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Header): We don't use the assuan namespace anymore.  
Document new thread options.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Change type of member class  
to unsigned int.

2003-08-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Get error code from SIG->status in the code  
for gpgme\_get\_sig\_status.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Add can\_authenticate flag.

\* gpgme.texi (Listing Keys): Document GPG\_ERR\_AMBIGUOUS\_NAME for  
gpgme\_get\_key.

2003-07-29 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (EXTRA\_DIST): Remove variable.

\* gpgme.texi (Encrypting a Plaintext): Bad passphrase is only  
possible with symmetric encryption, change the wording to reflect  
that.

\* gpgme.texi (Creating a Signature): Document  
GPG\_ERR\_UNUSABLE\_SECKEY.

\* gpgme.texi (Encrypting a Plaintext): Mention encrypt and sign  
operations in result function.

(Creating a Signature): Likewise.

2003-07-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Remove word duplication.  
(Listing Keys): Remove mentioning of force argument.  
(Verify): Don't mention r\_stat. Fix some typos.  
(Decrypt and Verify): Correct info how to get the result. Don't mention r\_stat.  
(Manipulating Data Buffers): Fix documentation of return value.  
(Listing Keys): Update examples.  
(Decrypt): Result might also be available when operation failed.  
(Verify): Result might also be available when operation failed.  
All spotted by Stphane Corthsy.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Sources): Fix cut and paste error.

2003-07-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Clarify difference between can\_sign and can\_certify.  
(Information About Keys): Likewise for GPGME\_ATTR\_CAN\_SIGN and GPGME\_ATTR\_CAN\_CERTIFY.

2003-07-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Progress Meter Callback): Change return type of gpgme\_progress\_cb\_t to void.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Add 2003 to copyright notice.

\* gpgme.texi (Header): Fix name space documentation on libgpg-error.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Remove reference to gpgme\_recipients\_t.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Crypto Operations): Rename gpgme\_invalid\_user\_id\_t to gpgme\_invalid\_key\_t.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Change error codes to GPG\_ERR\_\* variants.  
(Error Handling): Rewritten.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Exporting Keys): Change and document prototypes.  
Add new gpgme\_op\_export\_ext and gpgme\_op\_export\_ext\_start  
variants.  
(Selecting Recipients): Section removed.  
(Encrypting a Plaintext): Change prototypes and document the  
changes.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Exporting Keys): Change argument type from  
gpgme\_recipient\_t to gpgme\_user\_id\_t.  
(Encrypting a Plaintext): Likewise.  
(Selecting Recipients): Rewritten.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Protocol Selection): Do not use @acronym in @node  
because that breaks texi2dvi.  
  
\* gpgme.texi (Passphrase Callback): Document new prototype.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Header): Remove Gpgme as namespace prefix. Add  
\_GPGME to namespace prefix.  
\* gpgme.texi (Multi Threading): Add note about link order.

2003-05-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Document what happens if key is not  
found.  
  
\* gpgme.texi (Importing Keys): Fix cut and paste error.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Remove reference to  
gpgme\_get\_op\_info.  
(Detailed Results): Subsection removed.  
  
\* gpgme.texi (Key Listing Mode): Add GPGME\_KEYLIST\_MODE\_SIGS.

(Manipulating Keys): Add obsolescence note.  
(Key Signatures): Likewise.  
(Information About Keys): Likewise.  
(Key Management): Add new data types GpgmeSubkey, GpgmeKeySig, GpgmeUserID, and all the information about GpgmeKey.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Remove force\_update argument from gpgme\_get\_key.

\* gpgme.texi (Trust Item Management): Add data members of GpgmeTrustItem type.

(Information About Trust Items): Add note about obsolescence.

(Manipulating Trust Items): Add gpgme\_trust\_item\_ref and gpgme\_trust\_item\_unref.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Rewritten to take into account new and deprecated functions and data types.

\* gpgme.texi (Decrypt): Describe gpgme\_op\_decrypt\_result and GpgmeDecryptResult.

2003-04-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Add info about GpgmeEncryptResult and gpgme\_op\_encrypt\_result.

\* gpgme.texi (Creating a Signature): Add info about GpgmeNewSignature, GpgmeSignResult and gpgme\_op\_sign\_result.

(Crypto Operations): Add GpgmeInvalidUserID.

(Algorithms): New chapter.

\* gpgme.texi (Deleting Keys): Document

GPGME\_Ambiguous\_Specification.

(Error Values): Remove GPGME\_Invalid\_Type and GPGME\_Invalid\_Mode.

Add GPGME\_Unknown\_Reason, GPGME\_Not\_Found,

GPGME\_Ambiguous\_Specification, GPGME\_Wrong\_Key\_Usage,

GPGME\_Key\_Revoked, GPGME\_Key\_Expired, GPGME\_No\_CRL\_Known,

GPGME\_CRL\_Too\_Old, GPGME\_Policy\_Mismatch, GPGME\_No\_Secret\_Key,

GPGME\_Key\_Not\_Trusted, GPGME\_Issuer\_Missing, GPGME\_Chain\_Too\_Long,

GPGME\_Unsupported\_Algorithm, GPGME\_Sig\_Expired,

GPGME\_Bad\_Signature, GPGME\_No\_Public\_Key.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Change GPGME\_IMPORT\_PRIVATE to GPGME\_IMPORT\_SECRET.

\* gpgme.texi (Importing Keys): Remove note about gpgme\_get\_op\_info. (Detailed Results): Remove note about import.

\* gpgme.texi (Importing Keys): Add documentation for GpgmeImportStatus, GpgmeImportResult and gpgme\_op\_import\_result.

\* gpgme.texi (Generating Keys): Fix documentation of public and secret arguments.

2003-04-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating Keys): Document changed gpgme\_op\_genkey and new gpgme\_op\_genkey\_result function. Document GpgmeGenKeyResult data type.

\* gpgme.texi (Error Values): Rename GPGME\_No\_Passphrase to GPGME\_Bad\_Passphrase.

\* gpgme.texi (Decrypt): Likewise.

(Decrypt and Verify): Likewise.

(Creating a Signature): Likewise.

(Encrypting a Plaintext): Likewise.

\* gpgme.texi (Error Values): Rename GPGME\_No\_Recipients to GPGME\_No\_UserID and GPGME\_Invalid\_Recipient to GPGME\_Invalid\_UserID.

(Encrypting a Plaintext): Likewise.

\* gpgme.texi (Error Values): Remove GPGME\_Busy and GPGME\_No\_Request.

(Listing Keys): Likewise.

(Listing Trust Items): Likewise.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Cancelling an Operation): Removed.

(Passphrase Callback): Document new type for GpgmePassphraseCb.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Information): Rename member part to file\_name.

\* gpgme.texi (Protocols and Engines): Document gpgme\_get\_protocol\_name.

\* gpgme.texi (Engine Information): Rewritten.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (I/O Callback Interface): Document new even  
GPGME\_EVENT\_START.  
(Waiting For Completion): Document new possible return values.  
(I/O Callback Interface): Document return type of GpgmeIOCb.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Hooking Up Into Idle Time): Section removed.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Drop R\_STAT argument in gpgme\_op\_verify.  
\* gpgme.texi (Decrypt and Verify): Likewise for  
gpgme\_op\_decrypt\_verify.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Document that  
GPGME\_ATTR\_IS\_SECRET is not representable as a string anymore.

2002-12-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Signatures): New section.  
(Listing Keys): Add gpgme\_get\_key.

2002-12-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Memory Based Data Buffers): New subsection.  
(File Based Data Buffers): Likewise.  
(Callback Based Data Buffers): Likewise.  
(Manipulating Data Buffers): Update interfaces. Add  
gpgme\_data\_seek.  
\* gpgme.texi (Engine Version Check): Remove gpgme\_check\_engine.

2002-11-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Document the new interface.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating Keys): Document new argument to  
gpgme\_op\_genkey.

2002-11-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Fix prototype of gpgme\_get\_sig\_key.  
Reported by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-08-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Selecting Signers): Fix reference count.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Header): Document name space.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Document gpgme\_op\_import\_ext.

\* gpgme.texi (Importing Keys): Undocument EOF.

2002-08-14 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Information About Keys): Changed GPGME\_ATTR\_TYPE.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Deleting Keys): Say that secret keys might not be deleted.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Document (badly) the new key attributes.

\* gpgme.texi (Manipulating Data Buffers): Mention that backend tries to detect encoding automatically.

2002-07-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Run Control): Update this section.  
(Waiting For Completion): Likewise for this subsection.  
(Cancelling an Operation): Likewise for this subsection.  
(Using External Event Loops): New subsection with several subsections.

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Remove item about the need to synchronize anything against gpgme\_wait (except gpgme\_wait itself).

2002-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Fix documentation for IDX.  
(Information About Trust Items): Likewise.

2002-06-26 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Importing Keys): Document the return value -1 of  
gpgme\_op\_import.

2002-06-20 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Verify): Explain the new whatidx variable.

2002-06-10 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Verify): Document attribute GPGME\_ATTR\_ERRTOK.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Document new autodetection.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (DISTCLEANFILES): New variable.

2002-05-26 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Some typographical corrections throughout.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Using Automake): New section.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Escape { and }.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Overview): Replace note about thread-safeness.  
(Multi Threading): New section.

2002-05-03 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Manipulating Data Buffers): Changed some data types  
to void\*.

(Protocol Selection): Added gpgme\_get\_protocol.

(Verify): Updated to include the new attribute functions and status codes.

2002-04-27 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Manipulating Data Buffers): New type GpgmeDataEncoding.

2002-04-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Document that either return argument can be NULL.

(Progress Meter Callback): Likewise.

2002-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix small typo. Document the new function gpgme\_get\_passphrase\_cb.

(Progress Meter Callback): Document the new function gpgme\_get\_progress\_cb.

2002-04-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Fix function name. Reported by Wichert Ackerman <wichert@debian.org>.

2002-03-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (direntry): End index entry with a full stop. Patch submitted by Jose Carlos Garcia Sogo <jsogo@debian.org>.

2002-03-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Detailed Results): Fix syntax error in last change.

2002-03-08 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Detailed Results): Import does also return info.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document symmetric encryption.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Add example.

\* gpgme.texi (Listing Keys): Likewise.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Document GPGME\_ATTR\_EXPIRE.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Document verification of normal and cleartext signatures.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Document gpgme\_op\_keylist\_ext\_start.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document GPGME\_Invalid\_Recipients.  
(Error Values): Likewise.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document gpgme\_op\_encrypt\_sign and gpgme\_op\_encrypt\_sign\_start.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Add a note about certificates to include.  
(Included Certificates): New section.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Detailed Results): Remove literal tags.  
(Generating Keys): Update documentation.

\* gpgme.texi (Generating Keys): Fix syntax error.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Waiting For Completion): Adjust doc to changes in the code.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Update documentation.

2002-01-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating Keys): Document error at creation failure.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Deleting Keys): Document new error values.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Add reference to gpgme\_get\_op\_info.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Some spell checking.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Add all the gpgme\_op\_\*\_start functions.  
Fill the concept index with many, many entries.

2002-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Run Control): New section.  
(Verify): Document gpgme\_get\_notation.  
(More Information): New section describing gpgme\_get\_op\_info.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase callback): Change GpgmePassphraseCb's  
R\_HD type from void\* to void\*\*.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating data buffers): Change  
gpgme\_data\_new\_from\_filepart's LENGTH type from off\_t to size\_t.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating keys): New subsection.  
(Exporting keys): Likewise.  
(Importing keys): Likewise.  
(Deleting keys): Likewise.

2002-01-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: g10Code -> g10 Code

\* gpgme.texi (Top): Complete detailmenu.

\* gpgme.texi: Convert embarrassing cruft to the real thing.

2002-01-16 Marcus Brinkmann <marcus@g10code.de>

\* ChangeLog: New file.

\* gpgme.texi: Likewise.

\* gpl.texi: Likewise.

\* fdl.texi: Likewise.

\* Makefile.am (info\_TEXINFOS): New variable.

(gpgme\_TEXINFOS): Likewise.

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2011 g10 Code GmbH

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\input texinfo @c -\*- mode: texinfo; coding: utf-8; -\*-

@documentencoding UTF-8

@setfilename gpgme.info

@include defs.inc

@settitle The `GnuPG Made Easy' Reference Manual

@dircategory GNU Libraries

@direntry

\* @acronym{GPGME}: (gpgme). Adding support for cryptography to your program.

@end direntry

@c Unify some of the indices.

@syncodeindex tp fn

@syncodeindex pg fn

@copying

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@quotation

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@end quotation

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@end copying

@c Macros used by the description of the UI server protocol

@macro clnt{string}

@sc{c:} \string\

@end macro

@macro srvr{string}

@sc{s:} \string\

@end macro

@c API version.

@macro since{string}

@sc{Since:} \string\

@end macro

@c

@c T I T L E P A G E

@c

@ifinfo

This file documents the @acronym{GPGME} library.

This is Edition @value{EDITION}, last updated @value{UPDATED}, of @cite{The `GnuPG Made Easy' Reference Manual}, for Version @value{VERSION}.

@c NOTE: Don't forget to update the year for the TeX version, too.

@insertcopying

@end ifinfo

@c We do not want that bastard short titlepage.

@c @iftex

@c @shorttitlepage The `GnuPG Made Easy' Reference Manual

@c @end iftex

@titlepage

@center @titlefont{The `GnuPG Made Easy'}

@sp 1

@center @titlefont{Reference Manual}

@sp 6

@center Edition @value{EDITION}

@sp 1

@center last updated @value{UPDATED}

@sp 1

@center for version @value{VERSION}

@page

@vskip 0pt plus 1filll

Published by The GnuPG Project@\* c/o g10 Code GmbH@\* Httenstr. 61@\* 40699 Erkrath, Germany

@insertcopying

@end titlepage

@page

@summarycontents

@contents

@ifnottex

@node Top

@top Main Menu

This is Edition @value{EDITION}, last updated @value{UPDATED}, of

@cite{The `GnuPG Made Easy' Reference Manual}, for Version

@value{VERSION} of the @acronym{GPGME} library.

@end ifnottex

@menu

- \* Introduction:: How to use this manual.
- \* Preparation:: What you should do before using the library.
- \* Protocols and Engines:: Supported crypto protocols.
- \* Algorithms:: Supported algorithms.
- \* Error Handling:: Error numbers and their meanings.
- \* Exchanging Data:: Passing data to and from @acronym{GPGME}.
- \* Contexts:: Handling @acronym{GPGME} contexts.

Appendices

- \* UI Server Protocol:: The GnuPG UI Server Protocol.
- \* Debugging:: How to solve problems.
- \* Deprecated Functions:: Documentation of deprecated functions.
- \* Library Copying:: The GNU Lesser General Public License says how you can copy and share `GnuPG Made Easy'.
- \* Copying:: The GNU General Public License says how you can copy and share this manual.

Indices

- \* Concept Index:: Index of concepts and programs.
- \* Function and Data Index:: Index of functions, variables and data types.

@detailmenu

--- The Detailed Node Listing ---

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- \* Getting Started:: Purpose of the manual, and how to use it.
- \* Features:: Reasons to install and use @acronym{GPGME}.
- \* Overview:: Basic architecture of the @acronym{GPGME} library.

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- \* Header:: What header file you need to include.
- \* Building the Source:: Compiler options to be used.
- \* Largefile Support (LFS):: How to use @acronym{GPGME} with LFS.
- \* Using Automake:: Compiler options to be used the easy way.
- \* Using Libtool:: Avoiding compiler options entirely.
- \* Library Version Check:: Getting and verifying the library version.
- \* Signal Handling:: How @acronym{GPGME} affects signal handling.
- \* Multi-Threading:: How @acronym{GPGME} can be used in an MT environment.

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- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
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- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.

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- \* Public Key Algorithms:: A list of all public key algorithms.
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- \* Error Values:: The error value and what it means.
- \* Error Codes:: A list of important error codes.
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- \* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
- \* Data Buffer Convenience:: Convenience function for data buffers.

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- \* Creating Contexts:: Creating new @acronym{GPGME} contexts.
- \* Destroying Contexts:: Releasing @acronym{GPGME} contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with @acronym{GPGME}.
- \* Trust Item Management:: Managing trust items with @acronym{GPGME}.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations.
- \* Run Control:: Controlling how operations are run.

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- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting @acronym{ASCII} armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
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- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
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- \* Selecting Signers:: How to choose the keys to sign with.
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- \* Running other Programs:: Running other Programs.
- \* Using the Assuan protocol:: Using the Assuan protocol.
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- \* I/O Callback Interface:: How I/O callbacks are registered.
- \* Registering I/O Callbacks:: How to use I/O callbacks for a context.
- \* I/O Callback Example:: An example how to use I/O callbacks.
- \* I/O Callback Example GTK+:: How to integrate @acronym{GPGME} in GTK+.
- \* I/O Callback Example GDK:: How to integrate @acronym{GPGME} in GDK.
- \* I/O Callback Example Qt:: How to integrate @acronym{GPGME} in Qt.

@end detailmenu

@end menu

@node Introduction

@chapter Introduction

'GnuPG Made Easy' (@acronym{GPGME}) is a C language library that allows to add support for cryptography to a program. It is designed to make access to public key crypto engines like GnuPG or GpgSM easier for applications. @acronym{GPGME} provides a high-level crypto API for encryption, decryption, signing, signature verification and key management.

@acronym{GPGME} uses GnuPG and GpgSM as its backends to support OpenPGP and the Cryptographic Message Syntax (CMS).

@menu

- \* Getting Started:: Purpose of the manual, and how to use it.
- \* Features:: Reasons to install and use @acronym{GPGME}.
- \* Overview:: Basic architecture of the @acronym{GPGME} library.

@end menu

@node Getting Started

@section Getting Started

This manual documents the @acronym{GPGME} library programming interface. All functions and data types provided by the library are explained.

The reader is assumed to possess basic knowledge about cryptography in general, and public key cryptography in particular. The underlying cryptographic engines that are used by the library are not explained, but where necessary, special features or requirements by an engine are mentioned as far as they are relevant to @acronym{GPGME} or its users.

This manual can be used in several ways. If read from the beginning to the end, it gives a good introduction into the library and how it can be used in an application. Forward references are included where necessary. Later on, the manual can be used as a reference manual to get just the information needed about any particular interface of the library. Experienced programmers might want to start looking at the examples at the end of the manual, and then only read up those parts of the interface which are unclear.

The documentation for the language bindings is currently not included in this manual. Those languages bindings follow the general programming model of @acronym{GPGME} but may provide some extra high level abstraction on top of the @acronym{GPGME} style API. For now please see the README files in the @file{lang/} directory of the source distribution.

@node Features

@section Features

@acronym{GPGME} has a couple of advantages over other libraries doing a similar job, and over implementing support for GnuPG or other crypto engines into your application directly.

@table @asis

@item it's free software

Anybody can use, modify, and redistribute it under the terms of the GNU Lesser General Public License (@pxref{Library Copying}).

@item it's flexible

@acronym{GPGME} provides transparent support for several cryptographic protocols by different engines. Currently, @acronym{GPGME} supports the OpenPGP protocol using GnuPG as the backend, and the Cryptographic Message Syntax using GpgSM as the backend.

@item it's easy

@acronym{GPGME} hides the differences between the protocols and engines from the programmer behind an easy-to-use interface. This way the programmer can focus on the other parts of the program, and still integrate strong cryptography in his application. Once support for @acronym{GPGME} has been added to a program, it is easy to add support for other crypto protocols once @acronym{GPGME} backends provide them.

@item it's language friendly

@acronym{GPGME} comes with languages bindings for several common programming languages: Common Lisp, C++, Python 2, and Python 3.

@end table

@node Overview

@section Overview

@acronym{GPGME} provides a data abstraction that is used to pass data to the crypto engine, and receive returned data from it. Data can be read from memory or from files, but it can also be provided by a callback function.

The actual cryptographic operations are always set within a context. A context provides configuration parameters that define the behaviour of all operations performed within it. Only one operation per context is allowed at any time, but when one operation is finished, you can run the next operation in the same context. There can be more than one context, and all can run different operations at the same time.

Furthermore, @acronym{GPGME} has rich key management facilities including listing keys, querying their attributes, generating, importing, exporting and deleting keys, and acquiring information about the trust path.

With some precautions, @acronym{GPGME} can be used in a multi-threaded environment, although it is not completely thread safe and thus needs the support of the application.

@node Preparation

@chapter Preparation

To use @acronym{GPGME}, you have to perform some changes to your sources and the build system. The necessary changes are small and explained in the following sections. At the end of this chapter, it is described how the library is initialized, and how the requirements of the library are verified.

@menu

- \* Header::                   What header file you need to include.
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- \* Multi-Threading::         How @acronym{GPGME} can be used in an MT environment.

@end menu

@node Header

@section Header

@cindex header file

@cindex include file

All interfaces (data types and functions) of the library are defined in the header file `gpgme.h`. You must include this in all programs using the library, either directly or through some other header file, like this:

@example

```
#include <gpgme.h>
```

@end example

The name space of @acronym{GPGME} is @code{gpgme\_\*} for function names and data types and @code{GPGME\_\*} for other symbols. Symbols internal to @acronym{GPGME} take the form @code{\_gpgme\_\*} and @code{\_GPGME\_\*}.

Because `GPGME` makes use of the GPG Error library, using `GPGME` will also use the `GPG_ERR_*` name space directly, and the `gpg_err*`, `gpg_str*`, and `gpgmt_*` name space indirectly.

`Building the Source`

`Building the Source`

`compiler options`

`compiler flags`

If you want to compile a source file including the `gpgme.h` header file, you must make sure that the compiler can find it in the directory hierarchy. This is accomplished by adding the path to the directory in which the header file is located to the compilers include file search path (via the `-I` option).

However, the path to the include file is determined at the time the source is configured. To solve this problem, `gpgme` ships with a small helper program `gpgme-config` that knows about the path to the include file and other configuration options. The options that need to be added to the compiler invocation at compile time are output by the `--cflags` option to `gpgme-config`. The following example shows how it can be used at the command line:

`example`

```
gcc -c foo.c `gpgme-config --cflags`
```

`end example`

Adding the output of `gpgme-config --cflags` to the compiler command line will ensure that the compiler can find the `GPGME` header file.

A similar problem occurs when linking the program with the library. Again, the compiler has to find the library files. For this to work, the path to the library files has to be added to the library search path (via the `-L` option). For this, the option `--libs` to `gpgme-config` can be used. For convenience, this option also outputs all other options that are required to link the program with `GPGME` (in particular, the `-lgpgme` option). The example shows how to link `foo.o` with the `GPGME` library to a program `foo`.

`example`

```
gcc -o foo foo.o `gpgme-config --libs`
```

`end example`

Of course you can also combine both examples to a single command by specifying both options to `@command{gpgme-config}`:

```
@example
gcc -o foo foo.c `gpgme-config --cflags --libs`
@end example
```

If you need to detect the installed language bindings you can use `list` them using:

```
@example
gpgme-config --print-lang
@end example
```

or test for the availability using

```
@example
gpgme-config --have-lang=python && echo 'Bindings for Pythons available'
@end example
```

```
@node Largefile Support (LFS)
@section Largefile Support (LFS)
@cindex largefile support
@cindex LFS
```

`@acronym{GPGME}` is compiled with largefile support by default, if it is available on the system. This means that GPGME supports files larger than two gigabyte in size, if the underlying operating system can. On some systems, largefile support is already the default. On such systems, nothing special is required. However, some systems provide only support for files up to two gigabyte in size by default. Support for larger file sizes has to be specifically enabled.

To make a difficult situation even more complex, such systems provide two different types of largefile support. You can either get all relevant functions replaced with alternatives that are largefile capable, or you can get new functions and data types for largefile support added. Those new functions have the same name as their smallfile counterparts, but with a suffix of `64`.

An example: The data type `@code{off_t}` is 32 bit wide on GNU/Linux PC systems. To address offsets in large files, you can either enable largefile support add-on. Then a new data type `@code{off64_t}` is provided, which is 64 bit wide. Or you can replace the existing `@code{off_t}` data type with its 64 bit wide counterpart. All occurrences of `@code{off_t}` are then automagically replaced.

As if matters were not complex enough, there are also two different types of file descriptors in such systems. This is important because if file descriptors are exchanged between programs that use a different maximum file size, certain errors must be produced on some file descriptors to prevent subtle overflow bugs from occurring.

As you can see, supporting two different maximum file sizes at the same time is not at all an easy task. However, the maximum file size does matter for `GPGME`, because some data types it uses in its interfaces are affected by that. For example, the `off_t` data type is used in the `gpgme_data_seek` function, to match its `POSIX` counterpart. This affects the call-frame of the function, and thus the ABI of the library. Furthermore, file descriptors can be exchanged between `GPGME` and the application.

For you as the user of the library, this means that your program must be compiled in the same file size mode as the library. Luckily, there is absolutely no valid reason for new programs to not enable largefile support by default and just use that. The compatibility modes (small file sizes or dual mode) can be considered an historic artefact, only useful to allow for a transitional period.

On `POSIX` platforms `GPGME` is compiled using largefile support by default. This means that your application must do the same, at least as far as it is relevant for using the `gpgme.h` header file. All types in this header files refer to their largefile counterparts, if they are different from any default types on the system.

On 32 and 64 bit Windows platforms `off_t` is declared as 32 bit signed integer. There is no specific support for LFS in the C library. The recommendation from Microsoft is to use the native interface (`CreateFile` et al.) for large files. Released binary versions of `GPGME` (`libgpgme-11.dll`) have always been build with a 32 bit `off_t`. To avoid an ABI break we stick to this convention for 32 bit Windows by using `long` there. `GPGME` versions for 64 bit Windows have never been released and thus we are able to use `int64_t` instead of `off_t` there. For easier migration the typedef `gpgme_off_t` has been defined. The reason we cannot use `off_t` directly is that some toolchains (e.g. mingw64) introduce a `POSIX` compatible hack for `off_t`. Some widely used toolkits make use of this hack and in turn `GPGME` would need to use it also. However, this would introduce an ABI break and existing software making use of `libgpgme` might suffer from a severe break. Thus with version 1.4.2 we redefined all functions using `off_t` to use `gpgme_off_t` which is defined as explained above. This way we keep the ABI well defined and independent of any toolchain hacks. The bottom line is

that LFS support in `@acronym{GPGME}` is only available on 64 bit versions of Windows.

On POSIX platforms you can enable largefile support, if it is different from the default on the system the application is compiled on, by using the Autoconf macro `@code{AC_SYS_LARGEFILE}`. If you do this, then you don't need to worry about anything else: It will just work. In this case you might also want to use `@code{AC_FUNC_FSEEKO}` to take advantage of some new interfaces, and `@code{AC_TYPE_OFF_T}` (just in case).

If you do not use Autoconf, you can define the preprocessor symbol `@code{_FILE_OFFSET_BITS}` to 64 *before* including any header files, for example by specifying the option `@code{-D_FILE_OFFSET_BITS=64}` on the compiler command line. You will also want to define the preprocessor symbol `@code{LARGEFILE_SOURCE}` to 1 in this case, to take advantage of some new interfaces.

If you do not want to do either of the above, you probably know enough about the issue to invent your own solution. Just keep in mind that the `@acronym{GPGME}` header file expects that largefile support is enabled, if it is available. In particular, we do not support dual mode (`@code{_LARGEFILE64_SOURCE}`).

```
@node Using Automake
@section Using Automake
@cindex automake
@cindex autoconf
```

It is much easier if you use GNU Automake instead of writing your own Makefiles. If you do that you do not have to worry about finding and invoking the `@command{gpgme-config}` script at all. `@acronym{GPGME}` provides an extension to Automake that does all the work for you.

```
@c A simple macro for optional variables.
@macro ovar{varname}
@r{[]@var{\varname}@r{[]}
@end macro
@defmac AM_PATH_GPGME (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
@defmacx AM_PATH_GPGME_PTH (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
@defmacx AM_PATH_GPGME_PTHREAD (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
Check whether @acronym{GPGME} (at least version @var{minimum-version}, if given) exists on the host system. If it is found, execute @var{action-if-found}, otherwise do @var{action-if-not-found}, if given.
```

Additionally, the function defines `{GPGME_CFLAGS}` to the flags needed for compilation of the program to find the `{gpgme.h}` header file, and `{GPGME_LIBS}` to the linker flags needed to link the program to the `{GPGME}` library. If the used helper script does not match the target type you are building for a warning is printed and the string `{libgpgme}` is appended to the variable `{gpg_config_script_warn}`.

`{AM_PATH_GPGME_PTH}` checks for the version of `{GPGME}` that can be used with GNU Pth, and defines `{GPGME_PTH_CFLAGS}` and `{GPGME_PTH_LIBS}`.

`{AM_PATH_GPGME_PTHREAD}` checks for the version of `{GPGME}` that can be used with the native pthread implementation, and defines `{GPGME_PTHREAD_CFLAGS}` and `{GPGME_PTHREAD_LIBS}`. Since version 1.8.0 this is no longer required to `{GPGME_PTHREAD}` as `{GPGME}` itself is thread safe.

This macro searches for `{gpgme-config}` along the PATH. If you are cross-compiling, it is useful to set the environment variable `{SYSROOT}` to the top directory of your target. The macro will then first look for the helper program in the `{bin}` directory below that top directory. An absolute directory name must be used for `{SYSROOT}`. Finally, if the configure command line option `{--with-gpgme-prefix}` is used, only its value is used for the top directory below which the helper script is expected.

`{end defmac}`

You can use the defined Autoconf variables like this in your `{Makefile.am}`:

```
{example
AM_CPPFLAGS = ${GPGME_CFLAGS}
LDADD = ${GPGME_LIBS}
{end example
```

```
{node Using Libtool
{section Using Libtool
{cindex libtool
```

The easiest way is to just use GNU Libtool. If you use libtool, and link to `{libgpgme.la}`, `{libgpgme-pth.la}` or `{libgpgme-pthread.la}` respectively, everything will be done automatically by Libtool.

@node Library Version Check  
@section Library Version Check  
@cindex version check, of the library

```
@deftypefun {const char *} gpgme_check_version (@w{const char *}@var{required_version})
```

The function `gpgme_check_version` has four purposes. It can be used to retrieve the version number of the library. In addition it can verify that the version number is higher than a certain required version number. In either case, the function initializes some sub-systems, and for this reason alone it must be invoked early in your program, before you make use of the other functions in `acronym{GPGME}`. The last purpose is to run selftests.

As a side effect for W32 based systems, the socket layer will get initialized.

If `required_version` is `NULL`, the function returns a pointer to a statically allocated string containing the version number of the library.

If `required_version` is not `NULL`, it should point to a string containing a version number, and the function checks that the version of the library is at least as high as the version number provided. In this case, the function returns a pointer to a statically allocated string containing the version number of the library. If `REQUIRED_VERSION` is not a valid version number, or if the version requirement is not met, the function returns `NULL`.

If you use a version of a library that is backwards compatible with older releases, but contains additional interfaces which your program uses, this function provides a run-time check if the necessary features are provided by the installed version of the library.

If a selftest fails, the function may still succeed. Selftest errors are returned later when invoking `gpgme_new` or `gpgme-data_new`, so that a detailed error code can be returned (historically, `gpgme_check_version` does not return a detailed error code).

```
@end deftypefun
```

```
@deftypefun {int} gpgme_set_global_flag @  
  (@w{const char *}@var{name}), @  
  @w{const char *}@var{value})
```

@since{1.4.0}

On some systems it is not easy to set environment variables and thus hard to use @acronym{GPGME}'s internal trace facility for debugging. This function has been introduced as an alternative way to enable debugging and for a couple of other rarely used tweaks. It is important to assure that only one thread accesses @acronym{GPGME} functions between a call to this function and after the return from the call to @code{gpgme\_check\_version}.

All currently supported features require that this function is called as early as possible --- even before @code{gpgme\_check\_version}. The features are identified by the following values for @var{name}:

@table @code

@item debug

To enable debugging use the string ``debug" for @var{name} and @var{value} identical to the value used with the environment variable @code{GPGME\_DEBUG}.

@item disable-gpgconf

Using this feature with any @var{value} disables the detection of the gpgconf program and thus forces GPGME to fallback into the simple OpenPGP only mode. It may be used to force the use of GnuPG-1 on systems which have both GPG versions installed. Note that in general the use of @code{gpgme\_set\_engine\_info} is a better way to select a specific engine version.

@item gpgconf-name

@itemx gpg-name

Set the name of the gpgconf respective gpg binary. The defaults are @code{GNU/GnuPG/gpgconf} and @code{GNU/GnuPG/gpg}. Under Unix the leading directory part is ignored. Under Windows the leading directory part is used as the default installation directory; the @code{.exe} suffix is added by GPGME. Use forward slashed even under Windows.

@item require-gnupg

Set the minimum version of the required GnuPG engine. If that version is not met, GPGME fails early instead of trying to use the existent version. The given version must be a string with major, minor, and micro number. Example: "2.1.0".

@item w32-inst-dir

On Windows GPGME needs to know its installation directory to find its spawn helper. This is in general no problem because a DLL has this information. Some applications however link statically to GPGME and thus GPGME can only figure out the installation directory of this

application which may be wrong in certain cases. By supplying an installation directory as value to this flag, GPGME will assume that that directory is the installation directory. This flag has no effect on non-Windows platforms.

@end table

This function returns @code{0} on success. In contrast to other functions the non-zero return value on failure does not convey any error code. For setting ``debug" the only possible error cause is an out of memory condition; which would exhibit itself later anyway. Thus the return value may be ignored.

@end deftypefun

After initializing @acronym{GPGME}, you should set the locale information to the locale required for your output terminal. This locale information is needed for example for the curses and Gtk pinentry. Here is an example of a complete initialization:

@example

```
#include <locale.h>
```

```
#include <gpgme.h>
```

```
void
```

```
init_gpgme (void)
```

```
{
```

```
    /* Initialize the locale environment. */
```

```
    setlocale (LC_ALL, "");
```

```
    gpgme_check_version (NULL);
```

```
    gpgme_set_locale (NULL, LC_CTYPE, setlocale (LC_CTYPE, NULL));
```

```
#ifdef LC_MESSAGES
```

```
    gpgme_set_locale (NULL, LC_MESSAGES, setlocale (LC_MESSAGES, NULL));
```

```
#endif
```

```
}
```

```
@end example
```

Note that you are highly recommended to initialize the locale settings like this. @acronym{GPGME} can not do this for you because it would not be thread safe. The conditional on LC\_MESSAGES is only necessary for portability to W32 systems.

@node Signal Handling

@section Signal Handling

@cindex signals

@cindex signal handling

The `gpgme` library communicates with child processes (the crypto engines). If a child process dies unexpectedly, for example due to a bug, or system problem, a `SIGPIPE` signal will be delivered to the application. The default action is to abort the program. To protect against this, `gpgme_check_version` sets the `SIGPIPE` signal action to `SIG_IGN`, which means that the signal will be ignored.

`gpgme` will only do that if the signal action for `SIGPIPE` is `SIG_DEF` at the time `gpgme_check_version` is called. If it is something different, `gpgme` will take no action.

This means that if your application does not install any signal handler for `SIGPIPE`, you don't need to take any precautions. If you do install a signal handler for `SIGPIPE`, you must be prepared to handle any `SIGPIPE` events that occur due to `gpgme` writing to a defunct pipe. Furthermore, if your application is multi-threaded, and you install a signal action for `SIGPIPE`, you must make sure you do this either before `gpgme_check_version` is called or afterwards.

`Multi-Threading`  
`Multi-Threading`  
`thread-safeness`  
`multi-threading`

The `gpgme` library is mostly thread-safe, and can be used in a multi-threaded environment but there are some requirements for multi-threaded use:

`itemize` `bullet`  
`item`

The function `gpgme_check_version` must be called before any other function in the library, because it initializes the thread support subsystem in `gpgme`. To achieve this in multi-threaded programs, you must synchronize the memory with respect to other threads that also want to use `gpgme`. For this, it is sufficient to call `gpgme_check_version` before creating the other threads using `gpgme`. {At least this is true for POSIX threads, as `pthread_create` is a function that synchronizes memory with respects to other threads. There are many functions which have this property, a complete list can be found in POSIX, IEEE Std 1003.1-2003, Base Definitions, Issue 6, in the definition of the term "Memory Synchronization". For other thread packages other, more relaxed or more strict rules may apply.}

@item

Any @code{gpgme\_data\_t} and @code{gpgme\_ctx\_t} object must only be accessed by one thread at a time. If multiple threads want to deal with the same object, the caller has to make sure that operations on that object are fully synchronized.

@item

Only one thread at any time is allowed to call @code{gpgme\_wait}. If multiple threads call this function, the caller must make sure that all invocations are fully synchronized. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

@item

The function @code{gpgme\_strerror} is not thread safe. You have to use @code{gpgme\_strerror\_r} instead.

@end itemize

@node Protocols and Engines

@chapter Protocols and Engines

@cindex protocol

@cindex engine

@cindex crypto engine

@cindex backend

@cindex crypto backend

@acronym{GPGME} supports several cryptographic protocols, however, it does not implement them. Rather it uses backends (also called engines) which implement the protocol. @acronym{GPGME} uses inter-process communication to pass data back and forth between the application and the backend, but the details of the communication protocol and invocation of the backend is completely hidden by the interface. All complexity is handled by @acronym{GPGME}. Where an exchange of information between the application and the backend is necessary, @acronym{GPGME} provides the necessary callback function hooks and further interfaces.

@defntp {Data type} {enum gpgme\_protocol\_t}

@tindex gpgme\_protocol\_t

The @code{gpgme\_protocol\_t} type specifies the set of possible protocol values that are supported by @acronym{GPGME}. The following protocols are supported:

@table @code

@item GPGME\_PROTOCOL\_OpenPGP

@itemx GPGME\_PROTOCOL\_OPENPGP

This specifies the OpenPGP protocol.

@item GPGME\_PROTOCOL\_CMS

This specifies the Cryptographic Message Syntax.

@item GPGME\_PROTOCOL\_GPGCONF

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_ASSUAN

@since{1.2.0}

This specifies the raw Assuan protocol.

@item GPGME\_PROTOCOL\_G13

@since{1.3.0}

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_UISEVER

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_SPAWN

@since{1.5.0}

Special protocol for use with @code{gpgme\_op\_spawn}.

@item GPGME\_PROTOCOL\_UNKNOWN

Reserved for future extension. You may use this to indicate that the used protocol is not known to the application. Currently,

@acronym{GPGME} does not accept this value in any operation, though, except for @code{gpgme\_get\_protocol\_name}.

@end table

@end deftp

@deftypefun {const char \*} gpgme\_get\_protocol\_name (@w{gpgme\_protocol\_t} @var{protocol})

The function @code{gpgme\_get\_protocol\_name} returns a statically allocated string describing the protocol @var{protocol}, or

@code{NULL} if the protocol number is not valid.

@end deftypefun

@menu

- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
- \* Engine Configuration:: Changing the engine configuration.
- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.
- \* Assuan:: Support for the raw Assuan protocol.

@end menu

@node Engine Version Check  
@section Engine Version Check  
@cindex version check, of the engines

@deftypefun @w{const char \*} gpgme\_get\_dirinfo (@w{cons char \*}@var{what})  
@since{1.5.0}

The function @code{gpgme\_get\_dirinfo} returns a statically allocated string with the value associated to @var{what}. The returned values are the defaults and won't change even after @code{gpgme\_set\_engine\_info} has been used to configure a different engine. @code{NULL} is returned if no value is available. Commonly supported values for @var{what} are:

@table @code  
@item homedir  
Return the default home directory.

@item sysconfdir  
Return the name of the system configuration directory

@item bindir  
Return the name of the directory with GnuPG program files.

@item libdir  
Return the name of the directory with GnuPG related library files.

@item libexecdir  
Return the name of the directory with GnuPG helper program files.

@item datadir  
Return the name of the directory with GnuPG shared data.

@item localedir  
Return the name of the directory with GnuPG locale data.

@item agent-socket  
Return the name of the socket to connect to the gpg-agent.

@item agent-ssh-socket  
Return the name of the socket to connect to the ssh-agent component of gpg-agent.

@item dirmngr-socket  
Return the name of the socket to connect to the dirmngr.

@item uiserver-socket

Return the name of the socket to connect to the user interface server.

@item gpgconf-name

Return the file name of the engine configuration tool.

@item gpg-name

Return the file name of the OpenPGP engine.

@item gpgsm-name

Return the file name of the CMS engine.

@item g13-name

Return the name of the file container encryption engine.

@item gpg-wks-client-name

Return the name of the Web Key Service tool.

@end table

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_engine\_check\_version (@w{gpgme\_protocol\_t @var{protocol}})

The function @code{gpgme\_engine\_check\_version} verifies that the engine implementing the protocol @var{PROTOCOL} is installed in the expected path and meets the version requirement of @acronym{GPGME}.

This function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the engine is available and @code{GPG\_ERR\_INV\_ENGINE} if it is not.

@end deftypefun

@node Engine Information

@section Engine Information

@cindex engine, information about

@deftp {Data type} {gpgme\_engine\_info\_t}

@tindex gpgme\_protocol\_t

The @code{gpgme\_engine\_info\_t} type specifies a pointer to a structure describing a crypto engine. The structure contains the following elements:

@table @code

@item gpgme\_engine\_info\_t next

This is a pointer to the next engine info structure in the linked list, or @code{NULL} if this is the last element.

@item gpgme\_protocol\_t protocol

This is the protocol for which the crypto engine is used. You can convert this to a string with `gpgme_get_protocol_name` for printing.

`@item const char *file_name`

This is a string holding the file name of the executable of the crypto engine. Currently, it is never `NULL`, but using `NULL` is reserved for future use, so always check before you use it.

`@item const char *home_dir`

This is a string holding the directory name of the crypto engine's configuration directory. If it is `NULL`, then the default directory is used. See `gpgme_get_dirinfo` on how to get the default directory.

`@item const char *version`

This is a string containing the version number of the crypto engine. It might be `NULL` if the version number can not be determined, for example because the executable doesn't exist or is invalid.

`@item const char *req_version`

This is a string containing the minimum required version number of the crypto engine for `GPGME` to work correctly. This is the version number that `gpgme_engine_check_version` verifies against. Currently, it is never `NULL`, but using `NULL` is reserved for future use, so always check before you use it.

`@end table`

`@end deftp`

`@deftypefun gpgme_error_t gpgme_get_engine_info (@w{gpgme_engine_info_t *}@var{info})`

The function `gpgme_get_engine_info` returns a linked list of engine info structures in `@var{info}`. Each info structure describes the defaults of one configured backend.

The memory for the info structures is allocated the first time this function is invoked, and must not be freed by the caller.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, and a system error if the memory could not be allocated.

`@end deftypefun`

Here is an example how you can provide more diagnostics if you receive an error message which indicates that the crypto engine is invalid.

`@example`

```
gpgme_ctx_t ctx;
```

```
gpgme_error_t err;
```

[...]

```
if (gpgme_err_code (err) == GPG_ERR_INV_ENGINE)
@{
  gpgme_engine_info_t info;
  err = gpgme_get_engine_info (&info);
  if (!err)
    @{
      while (info && info->protocol != gpgme_get_protocol (ctx))
        info = info->next;
      if (!info)
        fprintf (stderr, "GPGME compiled without support for protocol %s",
                 gpgme_get_protocol_name (info->protocol));
      else if (info->file_name && !info->version)
        fprintf (stderr, "Engine %s not installed properly",
                 info->file_name);
      else if (info->file_name && info->version && info->req_version)
        fprintf (stderr, "Engine %s version %s installed, "
                 "but at least version %s required", info->file_name,
                 info->version, info->req_version);
      else
        fprintf (stderr, "Unknown problem with engine for protocol %s",
                 gpgme_get_protocol_name (info->protocol));
    @}
  @}
@end example
```

```
@node Engine Configuration
@section Engine Configuration
@cindex engine, configuration of
@cindex configuration of crypto backend
```

You can change the configuration of a backend engine, and thus change the executable program and configuration directory to be used. You can make these changes the default or set them for some contexts individually.

```
@deftypefun gpgme_error_t gpgme_set_engine_info (@w{gpgme_protocol_t @var{proto}}, @w{const char
*@var{file_name}}, @w{const char *@var{home_dir}})
@since{1.1.0}
```

The function `gpgme_set_engine_info` changes the default configuration of the crypto engine implementing the protocol `@var{proto}`.

`@var{file_name}` is the file name of the executable program implementing this protocol, and `@var{home_dir}` is the directory name

of the configuration directory for this crypto engine. If  
@var{home\_dir} is @code{NULL}, the engine's default will be used.

The new defaults are not applied to already created GPGME contexts.

This function returns the error code @code{GPG\_ERR\_NO\_ERROR} if  
successful, or an error code on failure.

@end deftypefun

The functions @code{gpgme\_ctx\_get\_engine\_info} and  
@code{gpgme\_ctx\_set\_engine\_info} can be used to change the engine  
configuration per context. @xref{Crypto Engine}.

@node OpenPGP

@section OpenPGP

@cindex OpenPGP

@cindex GnuPG

@cindex protocol, GnuPG

@cindex engine, GnuPG

OpenPGP is implemented by GnuPG, the @acronym{GNU} Privacy Guard.

This is the first protocol that was supported by @acronym{GPGME}.

The OpenPGP protocol is specified by @code{GPGME\_PROTOCOL\_OpenPGP}.

@node Cryptographic Message Syntax

@section Cryptographic Message Syntax

@cindex CMS

@cindex cryptographic message syntax

@cindex GpgSM

@cindex protocol, CMS

@cindex engine, GpgSM

@cindex S/MIME

@cindex protocol, S/MIME

@acronym{CMS} is implemented by GpgSM, the S/MIME implementation for  
GnuPG.

The @acronym{CMS} protocol is specified by @code{GPGME\_PROTOCOL\_CMS}.

@node Assuan

@section Assuan

@cindex ASSUAN

@cindex protocol, ASSUAN

@cindex engine, ASSUAN

Assuan is the RPC library used by the various @acronym{GnuPG} components. The Assuan protocol allows one to talk to arbitrary Assuan servers using @acronym{GPGME}. @xref{Using the Assuan protocol}.

The ASSUAN protocol is specified by @code{GPGME\_PROTOCOL\_ASSUAN}.

@node Algorithms

@chapter Algorithms

@cindex algorithms

The crypto backends support a variety of algorithms used in public key cryptography. @footnote{Some engines also provide symmetric only encryption; see the description of the encryption function on how to use this.} The following sections list the identifiers used to denote such an algorithm.

@menu

\* Public Key Algorithms:: A list of all public key algorithms.

\* Hash Algorithms:: A list of all hash algorithms.

@end menu

@node Public Key Algorithms

@section Public Key Algorithms

@cindex algorithms, public key

@cindex public key algorithms

Public key algorithms are used for encryption, decryption, signing and verification of signatures.

@defpt {Data type} {enum gpgme\_pubkey\_algo\_t}

@tindex gpgme\_pubkey\_algo\_t

The @code{gpgme\_pubkey\_algo\_t} type specifies the set of all public key algorithms that are supported by @acronym{GPGME}. Possible values are:

@table @code

@item GPGME\_PK\_RSA

This value indicates the RSA (Rivest, Shamir, Adleman) algorithm.

@item GPGME\_PK\_RSA\_E

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for encryption and decryption only.

@item GPGME\_PK\_RSA\_S

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for signing and verification only.

@item GPGME\_PK\_DSA

This value indicates DSA, the Digital Signature Algorithm.

@item GPGME\_PK\_ELG

This value indicates ElGamal.

@item GPGME\_PK\_ELG\_E

This value also indicates ElGamal and is used specifically in GnuPG.

@item GPGME\_PK\_ECC

@since{1.5.0}

This value is a generic indicator for elliptic curve algorithms.

@item GPGME\_PK\_ECDSA

@since{1.3.0}

This value indicates ECDSA, the Elliptic Curve Digital Signature Algorithm as defined by FIPS 186-2 and RFC-6637.

@item GPGME\_PK\_ECDH

@since{1.3.0}

This value indicates ECDH, the Elliptic Curve Diffie-Hellmann encryption algorithm as defined by RFC-6637.

@item GPGME\_PK\_EDDSA

@since{1.7.0}

This value indicates the EdDSA algorithm.

@end table

@end deftp

@deftypedefun {const char \*} gpgme\_pubkey\_algo\_name (@w{gpgme\_pubkey\_algo\_t @var{algo}})

The function @code{gpgme\_pubkey\_algo\_name} returns a pointer to a statically allocated string containing a description of the public key algorithm @var{algo}. This string can be used to output the name of the public key algorithm to the user.

If @var{algo} is not a valid public key algorithm, @code{NULL} is returned.

@end deftypedefun

@deftypedefun {char \*} gpgme\_pubkey\_algo\_string (@w{gpgme\_subkey\_t @var{key}})

@since{1.7.0}

The function @code{gpgme\_pubkey\_algo\_string} is a convenience function to build and return an algorithm string in the same way GnuPG does (e.g. ``rsa2048" or ``ed25519"). The caller must free the result using @code{gpgme\_free}. On error (e.g. invalid argument or memory exhausted), the function returns NULL and sets @code{ERRNO}.  
@end deftypefun

@node Hash Algorithms

@section Hash Algorithms

@cindex algorithms, hash

@cindex algorithms, message digest

@cindex hash algorithms

@cindex message digest algorithms

Hash (message digest) algorithms are used to compress a long message to make it suitable for public key cryptography.

@deftp {Data type} {enum gpgme\_hash\_algo\_t}

@tindex gpgme\_hash\_algo\_t

The @code{gpgme\_hash\_algo\_t} type specifies the set of all hash algorithms that are supported by @acronym{GPGME}. Possible values are:

@table @code

@item GPGME\_MD\_MD5

@item GPGME\_MD\_SHA1

@item GPGME\_MD\_RMD160

@item GPGME\_MD\_MD2

@item GPGME\_MD\_TIGER

@item GPGME\_MD\_HAVAL

@item GPGME\_MD\_SHA256

@item GPGME\_MD\_SHA384

@item GPGME\_MD\_SHA512

@item GPGME\_MD\_SHA224

@since{1.5.0}

@item GPGME\_MD\_MD4

@item GPGME\_MD\_CRC32

@item GPGME\_MD\_CRC32\_RFC1510

@item GPGME\_MD\_CRC24\_RFC2440

@end table

@end deftp

@deftypefun {const char \*} gpgme\_hash\_algo\_name (@w{gpgme\_hash\_algo\_t @var{algo}})

The function @code{gpgme\_hash\_algo\_name} returns a pointer to a statically allocated string containing a description of the hash

algorithm `@var{algo}`. This string can be used to output the name of the hash algorithm to the user.

If `@var{algo}` is not a valid hash algorithm, `@code{NULL}` is returned.  
@end deftypefun

@node Error Handling  
@chapter Error Handling  
@cindex error handling

Many functions in `@acronym{GPGME}` can return an error if they fail. For this reason, the application should always catch the error condition and take appropriate measures, for example by releasing the resources and passing the error up to the caller, or by displaying a descriptive message to the user and cancelling the operation.

Some error values do not indicate a system error or an error in the operation, but the result of an operation that failed properly. For example, if you try to decrypt a tempered message, the decryption will fail. Another error value actually means that the end of a data buffer or list has been reached. The following descriptions explain for many error codes what they mean usually. Some error values have specific meanings if returned by a certain functions. Such cases are described in the documentation of those functions.

`@acronym{GPGME}` uses the `@code{libgpg-error}` library. This allows to share the error codes with other components of the GnuPG system, and thus pass error values transparently from the crypto engine, or some helper application of the crypto engine, to the user. This way no information is lost. As a consequence, `@acronym{GPGME}` does not use its own identifiers for error codes, but uses those provided by `@code{libgpg-error}`. They usually start with `@code{GPG_ERR_}`.

However, `@acronym{GPGME}` does provide aliases for the functions defined in `libgpg-error`, which might be preferred for name space consistency.

@menu  
\* Error Values::           The error value and what it means.  
\* Error Sources::         A list of important error sources.  
\* Error Codes::           A list of important error codes.  
\* Error Strings::         How to get a descriptive string from a value.  
@end menu

@node Error Values  
@section Error Values

@cindex error values  
@cindex error codes  
@cindex error sources

@deftp {Data type} {gpgme\_err\_code\_t}

The @code{gpgme\_err\_code\_t} type is an alias for the @code{libgpg-error} type @code{gpg\_err\_code\_t}. The error code indicates the type of an error, or the reason why an operation failed.

A list of important error codes can be found in the next section.

@end deftp

@deftp {Data type} {gpgme\_err\_source\_t}

The @code{gpgme\_err\_source\_t} type is an alias for the @code{libgpg-error} type @code{gpg\_err\_source\_t}. The error source has not a precisely defined meaning. Sometimes it is the place where the error happened, sometimes it is the place where an error was encoded into an error value. Usually the error source will give an indication to where to look for the problem. This is not always true, but it is attempted to achieve this goal.

A list of important error sources can be found in the next section.

@end deftp

@deftp {Data type} {gpgme\_error\_t}

The @code{gpgme\_error\_t} type is an alias for the @code{libgpg-error} type @code{gpg\_error\_t}. An error value like this has always two components, an error code and an error source. Both together form the error value.

Thus, the error value can not be directly compared against an error code, but the accessor functions described below must be used.

However, it is guaranteed that only 0 is used to indicate success (@code{GPG\_ERR\_NO\_ERROR}), and that in this case all other parts of the error value are set to 0, too.

Note that in @acronym{GPGME}, the error source is used purely for diagnostical purposes. Only the error code should be checked to test for a certain outcome of a function. The manual only documents the error code part of an error value. The error source is left unspecified and might be anything.

@end deftp

@deftypefun {static inline gpgme\_err\_code\_t} gpgme\_err\_code (@w{gpgme\_error\_t @var{err}})

The static inline function @code{gpgme\_err\_code} returns the @code{gpgme\_err\_code\_t} component of the error value @var{err}. This function must be used to extract the error code from an error value in order to compare it with the @code{GPG\_ERR\_\*} error code macros.

@end deffun

```
@deffun {static inline gpgme_err_source_t} gpgme_err_source (@w{gpgme_error_t @var{err}})
```

The static inline function @code{gpgme\_err\_source} returns the @code{gpgme\_err\_source\_t} component of the error value @var{err}. This function must be used to extract the error source from an error value in order to compare it with the @code{GPG\_ERR\_SOURCE\_\*} error source macros.

@end deffun

```
@deffun {static inline gpgme_error_t} gpgme_err_make (@w{gpgme_err_source_t @var{source}}, @w{gpgme_err_code_t @var{code}})
```

The static inline function @code{gpgme\_err\_make} returns the error value consisting of the error source @var{source} and the error code @var{code}.

This function can be used in callback functions to construct an error value to return it to the library.

@end deffun

```
@deffun {static inline gpgme_error_t} gpgme_error (@w{gpgme_err_code_t @var{code}})
```

The static inline function @code{gpgme\_error} returns the error value consisting of the default error source and the error code @var{code}.

For @acronym{GPGME} applications, the default error source is @code{GPG\_ERR\_SOURCE\_USER\_1}. You can define @code{GPGME\_ERR\_SOURCE\_DEFAULT} before including @file{gpgme.h} to change this default.

This function can be used in callback functions to construct an error value to return it to the library.

@end deffun

The @code{libgpg-error} library provides error codes for all system error numbers it knows about. If @var{err} is an unknown error number, the error code @code{GPG\_ERR\_UNKNOWN\_ERRNO} is used. The following functions can be used to construct error values from system error numbers.

```
@deffun {gpgme_error_t} gpgme_err_make_from_errno (@w{gpgme_err_source_t @var{source}}, @w{int @var{err}})
```

The function @code{gpgme\_err\_make\_from\_errno} is like @code{gpgme\_err\_make}, but it takes a system error like @code{errno} instead of a @code{gpgme\_err\_code\_t} error code.

@end deffun

```
@deffun {gpgme_error_t} gpgme_error_from_errno (@w{int @var{err}})
```

The function @code{gpgme\_error\_from\_errno} is like @code{gpgme\_error}, but it takes a system error like @code{errno} instead of a

@code{gpgme\_err\_code\_t} error code.

@end deftypefun

Sometimes you might want to map system error numbers to error codes directly, or map an error code representing a system error back to the system error number. The following functions can be used to do that.

@deftypefun {gpgme\_err\_code\_t} gpgme\_err\_code\_from\_errno (@w{int @var{err}})

The function @code{gpgme\_err\_code\_from\_errno} returns the error code for the system error @var{err}. If @var{err} is not a known system error, the function returns @code{GPG\_ERR\_UNKNOWN\_ERRNO}.

@end deftypefun

@deftypefun {int} gpgme\_err\_code\_to\_errno (@w{gpgme\_err\_code\_t @var{err}})

The function @code{gpgme\_err\_code\_to\_errno} returns the system error for the error code @var{err}. If @var{err} is not an error code representing a system error, or if this system error is not defined on this system, the function returns @code{0}.

@end deftypefun

@node Error Sources

@section Error Sources

@cindex error codes, list of

The library @code{libpgp-error} defines an error source for every component of the GnuPG system. The error source part of an error value is not well defined. As such it is mainly useful to improve the diagnostic error message for the user.

If the error code part of an error value is @code{0}, the whole error value will be @code{0}. In this case the error source part is of course @code{GPG\_ERR\_SOURCE\_UNKNOWN}.

The list of error sources that might occur in applications using @acronym{GPGME} is:

@table @code

@item GPG\_ERR\_SOURCE\_UNKNOWN

The error source is not known. The value of this error source is @code{0}.

@item GPG\_ERR\_SOURCE\_GPGME

The error source is @acronym{GPGME} itself. This is the default for errors that occur in the @acronym{GPGME} library.

@item GPG\_ERR\_SOURCE\_GPG

The error source is GnuPG, which is the crypto engine used for the

OpenPGP protocol.

@item GPG\_ERR\_SOURCE\_GPGSM

The error source is GPGSM, which is the crypto engine used for the CMS protocol.

@item GPG\_ERR\_SOURCE\_GCRYPT

The error source is @code{libgcrypt}, which is used by crypto engines to perform cryptographic operations.

@item GPG\_ERR\_SOURCE\_GPGAGENT

The error source is @command{gpg-agent}, which is used by crypto engines to perform operations with the secret key.

@item GPG\_ERR\_SOURCE\_PINENTRY

The error source is @command{pinentry}, which is used by @command{gpg-agent} to query the passphrase to unlock a secret key.

@item GPG\_ERR\_SOURCE\_SCD

The error source is the SmartCard Daemon, which is used by @command{gpg-agent} to delegate operations with the secret key to a SmartCard.

@item GPG\_ERR\_SOURCE\_KEYBOX

The error source is @code{libkbx}, a library used by the crypto engines to manage local keyrings.

@item GPG\_ERR\_SOURCE\_USER\_1

@item GPG\_ERR\_SOURCE\_USER\_2

@item GPG\_ERR\_SOURCE\_USER\_3

@item GPG\_ERR\_SOURCE\_USER\_4

These error sources are not used by any GnuPG component and can be used by other software. For example, applications using

@acronym{GPGME} can use them to mark error values coming from callback handlers. Thus @code{GPG\_ERR\_SOURCE\_USER\_1} is the default for errors created with @code{gpgme\_error} and @code{gpgme\_error\_from\_erno}, unless you define @code{GPGME\_ERR\_SOURCE\_DEFAULT} before including @file{gpgme.h}.

@end table

@node Error Codes

@section Error Codes

@cindex error codes, list of

The library @code{libpgp-error} defines many error values. Most of them are not used by @code{GPGME} directly, but might be returned by @acronym{GPGME} because it received them from the crypto engine. The

below list only includes such error codes that have a specific meaning in `@code{GPGME}`, or which are so common that you should know about them.

@table @code

@item GPG\_ERR\_EOF

This value indicates the end of a list, buffer or file.

@item GPG\_ERR\_NO\_ERROR

This value indicates success. The value of this error code is `@code{0}`. Also, it is guaranteed that an error value made from the error code `@code{0}` will be `@code{0}` itself (as a whole). This means that the error source information is lost for this error code, however, as this error code indicates that no error occurred, this is generally not a problem.

@item GPG\_ERR\_GENERAL

This value means that something went wrong, but either there is not enough information about the problem to return a more useful error value, or there is no separate error value for this type of problem.

@item GPG\_ERR\_ENOMEM

This value means that an out-of-memory condition occurred.

@item GPG\_ERR\_E...

System errors are mapped to `GPG_ERR_FOO` where FOO is the symbol for the system error.

@item GPG\_ERR\_INV\_VALUE

This value means that some user provided data was out of range. This can also refer to objects. For example, if an empty `@code{gpgme_data_t}` object was expected, but one containing data was provided, this error value is returned.

@item GPG\_ERR\_UNUSABLE\_PUBKEY

This value means that some recipients for a message were invalid.

@item GPG\_ERR\_UNUSABLE\_SECKEY

This value means that some signers were invalid.

@item GPG\_ERR\_NO\_DATA

This value means that a `@code{gpgme_data_t}` object which was expected to have content was found empty.

@item GPG\_ERR\_CONFLICT

This value means that a conflict of some sort occurred.

@item GPG\_ERR\_NOT\_IMPLEMENTED

This value indicates that the specific function (or operation) is not implemented. This error should never happen. It can only occur if you use certain values or configuration options which do not work, but for which we think that they should work at some later time.

@item GPG\_ERR\_DECRYPT\_FAILED

This value indicates that a decryption operation was unsuccessful.

@item GPG\_ERR\_BAD\_PASSPHRASE

This value means that the user did not provide a correct passphrase when requested.

@item GPG\_ERR\_CANCELED

This value means that the operation was canceled.

@item GPG\_ERR\_INV\_ENGINE

This value means that the engine that implements the desired protocol is currently not available. This can either be because the sources were configured to exclude support for this engine, or because the engine is not installed properly.

@item GPG\_ERR\_AMBIGUOUS\_NAME

This value indicates that a user ID or other specifier did not specify a unique key.

@item GPG\_ERR\_WRONG\_KEY\_USAGE

This value indicates that a key is not used appropriately.

@item GPG\_ERR\_CERT\_REVOKED

This value indicates that a key signature was revoked.

@item GPG\_ERR\_CERT\_EXPIRED

This value indicates that a key signature expired.

@item GPG\_ERR\_NO\_CRL\_KNOWN

This value indicates that no certificate revocation list is known for the certificate.

@item GPG\_ERR\_NO\_POLICY\_MATCH

This value indicates that a policy issue occurred.

@item GPG\_ERR\_NO\_SECKEY

This value indicates that no secret key for the user ID is available.

@item GPG\_ERR\_MISSING\_CERT

This value indicates that a key could not be imported because the issuer certificate is missing.

@item GPG\_ERR\_BAD\_CERT\_CHAIN

This value indicates that a key could not be imported because its certificate chain is not good, for example it could be too long.

@item GPG\_ERR\_UNSUPPORTED\_ALGORITHM

This value means a verification failed because the cryptographic algorithm is not supported by the crypto backend.

@item GPG\_ERR\_BAD\_SIGNATURE

This value means a verification failed because the signature is bad.

@item GPG\_ERR\_NO\_PUBKEY

This value means a verification failed because the public key is not available.

@item GPG\_ERR\_USER\_1

@item GPG\_ERR\_USER\_2

@item ...

@item GPG\_ERR\_USER\_16

These error codes are not used by any GnuPG component and can be freely used by other software. Applications using @acronym{GPGME} might use them to mark specific errors returned by callback handlers if no suitable error codes (including the system errors) for these errors exist already.

@end table

@node Error Strings

@section Error Strings

@cindex error values, printing of

@cindex error codes, printing of

@cindex error sources, printing of

@cindex error strings

@deftypefun {const char \*} gpgme\_strerror (@w{gpgme\_error\_t @var{err}})

The function @code{gpgme\_strerror} returns a pointer to a statically allocated string containing a description of the error code contained in the error value @var{err}. This string can be used to output a diagnostic message to the user.

This function is not thread safe. Use @code{gpgme\_strerror\_r} in multi-threaded programs.

@end deftypefun

@deftypefun {int} gpgme\_strerror\_r (@w{gpgme\_error\_t @var{err}}, @w{char \*@var{buf}}, @w{size\_t @var{buflen}})

The function @code{gpgme\_strerror\_r} returns the error string for

@var{err} in the user-supplied buffer @var{buf} of size @var{buflen}. This function is, in contrast to @code{gpgme\_strerror}, thread-safe if a thread-safe @code{strerror\_r} function is provided by the system. If the function succeeds, 0 is returned and @var{buf} contains the string describing the error. If the buffer was not large enough, ERANGE is returned and @var{buf} contains as much of the beginning of the error string as fits into the buffer.

@end deftypefun

@deftypefun {const char \*} gpgme\_strerror (@w{gpgme\_error\_t @var{err}})

The function @code{gpgme\_strerror} returns a pointer to a statically allocated string containing a description of the error source contained in the error value @var{err}. This string can be used to output a diagnostic message to the user.

@end deftypefun

The following example illustrates the use of @code{gpgme\_strerror}:

```
@example
gpgme_ctx_t ctx;
gpgme_error_t err = gpgme_new (&ctx);
if (err)
@{
    fprintf (stderr, "%s: creating GpgME context failed: %s: %s\n",
            argv[0], gpgme_strerror (err), gpgme_strerror (err));
    exit (1);
@}
@end example
```

@node Exchanging Data  
@chapter Exchanging Data  
@cindex data, exchanging

A lot of data has to be exchanged between the user and the crypto engine, like plaintext messages, ciphertext, signatures and information about the keys. The technical details about exchanging the data information are completely abstracted by @acronym{GPGME}. The user provides and receives the data via @code{gpgme\_data\_t} objects, regardless of the communication protocol between @acronym{GPGME} and the crypto engine in use.

@deftp {Data type} {gpgme\_data\_t}

The @code{gpgme\_data\_t} type is a handle for a container for generic data, which is used by @acronym{GPGME} to exchange data with the user.

@end deftp

`gpgme_data_t` objects do not provide notifications on events. It is assumed that read and write operations are blocking until data is available. If this is undesirable, the application must ensure that all GPGME data operations always have data available, for example by using memory buffers or files rather than pipes or sockets. This might be relevant, for example, if the external event loop mechanism is used.

```
@deftp {Data type} {gpgme_off_t}
@since{1.4.1}
```

On POSIX platforms the `gpgme_off_t` type is an alias for `off_t`; it may be used interchangeably. On Windows platforms `gpgme_off_t` is defined as a long (i.e. 32 bit) for 32 bit Windows and as a 64 bit signed integer for 64 bit Windows.

```
@end deftp
```

```
@deftp {Data type} {gpgme_ssize_t}
```

The `gpgme_ssize_t` type is an alias for `ssize_t`. It has only been introduced to overcome portability problems pertaining to the declaration of `ssize_t` by different toolchains.

```
@end deftp
```

```
@menu
* Creating Data Buffers::      Creating new data buffers.
* Destroying Data Buffers::   Releasing data buffers.
* Manipulating Data Buffers:: Operations on data buffers.
@end menu
```

```
@node Creating Data Buffers
@section Creating Data Buffers
@cindex data buffer, creation
```

Data objects can be based on memory, files, or callback functions provided by the user. Not all operations are supported by all objects.

```
@menu
* Memory Based Data Buffers:: Creating memory based data buffers.
* File Based Data Buffers::   Creating file based data buffers.
* Callback Based Data Buffers:: Creating callback based data buffers.
@end menu
```

```
@node Memory Based Data Buffers
```

## @subsection Memory Based Data Buffers

Memory based data objects store all data in allocated memory. This is convenient, but only practical for an amount of data that is a fraction of the available physical memory. The data has to be copied from its source and to its destination, which can often be avoided by using one of the other data object

```
@deftypefun gpgme_error_t gpgme_data_new (@w{gpgme_data_t *}@var{dh})
```

The function `gpgme_data_new` creates a new `gpgme_data_t` object and returns a handle for it in `dh`. The data object is memory based and initially empty.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_data_new_from_mem (@w{gpgme_data_t *}@var{dh}, @w{const char *}@var{buffer}, @w{size_t @var{size}}, @w{int @var{copy}})
```

The function `gpgme_data_new_from_mem` creates a new `gpgme_data_t` object and fills it with `size` bytes starting from `buffer`.

If `copy` is not zero, a private copy of the data is made. If `copy` is zero, the data is taken from the specified buffer as needed, and the user has to ensure that the buffer remains valid for the whole life span of the data object.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` or `buffer` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_data_new_from_file (@w{gpgme_data_t *}@var{dh}, @w{const char *}@var{filename}, @w{int @var{copy}})
```

The function `gpgme_data_new_from_file` creates a new `gpgme_data_t` object and fills it with the content of the file `filename`.

If `copy` is not zero, the whole file is read in at initialization time and the file is not used anymore after that. This is the only mode supported currently. Later, a value of zero for `copy` might cause all reads to be delayed until the data is needed, but this is not yet implemented.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` or `filename` is not a valid pointer, `GPG_ERR_NOT_IMPLEMENTED` if `code` is zero, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deotypefun

@deotypefun gpgme\_error\_t gpgme\_data\_new\_from\_filepart (@w{gpgme\_data\_t \*dh}, @w{const char \*filename}, @w{FILE \*fp}, @w{off\_t offset}, @w{size\_t length})

The function `gpgme_data_new_from_filepart` creates a new `gpgme_data_t` object and fills it with a part of the file specified by `filename` or `fp`.

Exactly one of `filename` and `fp` must be non-zero, the other must be zero. The argument that is not zero specifies the file from which `length` bytes are read into the data object, starting from `offset`.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` and exactly one of `filename` and `fp` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deotypefun

@node File Based Data Buffers

@subsection File Based Data Buffers

File based data objects operate directly on file descriptors or streams. Only a small amount of data is stored in core at any time, so the size of the data objects is not limited by `GPGME`.

@deotypefun gpgme\_error\_t gpgme\_data\_new\_from\_fd (@w{gpgme\_data\_t \*dh}, @w{int fd})

The function `gpgme_data_new_from_fd` creates a new `gpgme_data_t` object and uses the file descriptor `fd` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the file descriptor than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that `GPGME` assumes that the file descriptor is set to blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not

enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_stream (@w{gpgme_data_t *}@var{dh}), @w{FILE
*@var{stream}})
```

The function @code{gpgme\_data\_new\_from\_stream} creates a new @code{gpgme\_data\_t} object and uses the I/O stream @var{stream} to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the data object was successfully created, and @code{GPG\_ERR\_ENOMEM} if not enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_estream (@w{gpgme_data_t *}@var{dh}),
@w{gpgrt_stream_t @var{stream}})
```

The function @code{gpgme\_data\_new\_from\_estream} creates a new @code{gpgme\_data\_t} object and uses the gpgrt stream @var{stream} to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the data object was successfully created, and @code{GPG\_ERR\_ENOMEM} if not enough memory is available.

@end deftypefun

@node Callback Based Data Buffers

@subsection Callback Based Data Buffers

If neither memory nor file based data objects are a good fit for your

application, you can implement the functions a data object provides yourself and create a data object from these callback functions.

```
@deftp {Data type} {ssize_t (*gpgme_data_read_cb_t) (@w{void *}@var{handle}), @w{void @var{*buffer}},  
@w{size_t @var{size}})}  
@tindex gpgme_data_read_cb_t
```

The @code{gpgme\_data\_read\_cb\_t} type is the type of functions which @acronym{GPGME} calls if it wants to read data from a user-implemented data object. The function should read up to @var{size} bytes from the current read position into the space starting at @var{buffer}. The @var{handle} is provided by the user at data object creation time.

Note that GPGME assumes that the read blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes read, 0 on EOF, and -1 on error. If an error occurs, @var{errno} should be set to describe the type of the error.

```
@end deftp
```

```
@deftp {Data type} {ssize_t (*gpgme_data_write_cb_t) (@w{void *}@var{handle}), @w{const void  
@var{*buffer}}, @w{size_t @var{size}})}  
@tindex gpgme_data_write_cb_t
```

The @code{gpgme\_data\_write\_cb\_t} type is the type of functions which @acronym{GPGME} calls if it wants to write data to a user-implemented data object. The function should write up to @var{size} bytes to the current write position from the space starting at @var{buffer}. The @var{handle} is provided by the user at data object creation time.

Note that GPGME assumes that the write blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes written, and -1 on error. If an error occurs, @var{errno} should be set to describe the type of the error.

```
@end deftp
```

```
@deftp {Data type} {off_t (*gpgme_data_seek_cb_t) (@w{void *}@var{handle}), @w{off_t @var{offset}},  
@w{int @var{whence}})}  
@tindex gpgme_data_seek_cb_t
```

The @code{gpgme\_data\_seek\_cb\_t} type is the type of functions which @acronym{GPGME} calls if it wants to change the current read/write position in a user-implemented data object, just like the @code{lseek} function.

The function should return the new read/write position, and -1 on

error. If an error occurs, `@var{errno}` should be set to describe the type of the error.

`@end deftp`

```
@deftp {Data type} {void (*gpgme_data_release_cb_t) (@w{void *@var{handle}})}
```

```
@tindex gpgme_data_release_cb_t
```

The `@code{gpgme_data_release_cb_t}` type is the type of functions which `@acronym{GPGME}` calls if it wants to destroy a user-implemented data object. The `@var{handle}` is provided by the user at data object creation time.

`@end deftp`

```
@deftp {Data type} {struct gpgme_data_cbs}
```

This structure is used to store the data callback interface functions described above. It has the following members:

```
@table @code
```

```
@item gpgme_data_read_cb_t read
```

This is the function called by `@acronym{GPGME}` to read data from the data object. It is only required for input data object.

```
@item gpgme_data_write_cb_t write
```

This is the function called by `@acronym{GPGME}` to write data to the data object. It is only required for output data object.

```
@item gpgme_data_seek_cb_t seek
```

This is the function called by `@acronym{GPGME}` to change the current read/write pointer in the data object (if available). It is optional.

```
@item gpgme_data_release_cb_t release
```

This is the function called by `@acronym{GPGME}` to release a data object. It is optional.

```
@end table
```

```
@end deftp
```

```
@deftypedefun gpgme_error_t gpgme_data_new_from_cbs (@w{gpgme_data_t *@var{dh}},
```

```
@w{gpgme_data_cbs_t @var{cbs}}, @w{void *@var{handle}})
```

The function `@code{gpgme_data_new_from_cbs}` creates a new `@code{gpgme_data_t}` object and uses the user-provided callback functions to operate on the data object.

The handle `@var{handle}` is passed as first argument to the callback functions. This can be used to identify this data object.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the data object was successfully created, and `@code{GPG_ERR_ENOMEM}` if not enough memory is available.

```
@end deftypedefun
```

@node Destroying Data Buffers  
@section Destroying Data Buffers  
@cindex data buffer, destruction

@deftypefun void gpgme\_data\_release (@w{gpgme\_data\_t @var{dh}})  
The function @code{gpgme\_data\_release} destroys the data object with the handle @var{dh}. It releases all associated resources that were not provided by the user in the first place.  
@end deftypefun

@deftypefun {char \*} gpgme\_data\_release\_and\_get\_mem (@w{gpgme\_data\_t @var{dh}}, @w{size\_t \*@var{length}})  
The function @code{gpgme\_data\_release\_and\_get\_mem} is like @code{gpgme\_data\_release}, except that it returns the data buffer and its length that was provided by the object.

The user has to release the buffer with @code{gpgme\_free}. In case the user provided the data buffer in non-copy mode, a copy will be made for this purpose.

In case an error returns, or there is no suitable data buffer that can be returned to the user, the function will return @code{NULL}. In any case, the data object @var{dh} is destroyed.  
@end deftypefun

@deftypefun void gpgme\_free (@w{void \*@var{buffer}})  
@since{1.1.1}

The function @code{gpgme\_free} releases the memory returned by @code{gpgme\_data\_release\_and\_get\_mem} and @code{gpgme\_pubkey\_algo\_string}. It should be used instead of the system libraries @code{free} function in case different allocators are used by a program. This is often the case if gpgme is used under Windows as a DLL.  
@end deftypefun

@node Manipulating Data Buffers  
@section Manipulating Data Buffers  
@cindex data buffer, manipulation

Data buffers contain data and meta-data. The following operations can be used to manipulate both.

@menu  
\* Data Buffer I/O Operations:: I/O operations on data buffers.  
\* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.  
\* Data Buffer Convenience:: Convenience function for data buffers.  
@end menu

@node Data Buffer I/O Operations  
@subsection Data Buffer I/O Operations  
@cindex data buffer, I/O operations  
@cindex data buffer, read  
@cindex data buffer, write  
@cindex data buffer, seek

@deftypefun ssize\_t gpgme\_data\_read (@w{gpgme\_data\_t @var{dh}}, @w{void \*@var{buffer}}, @w{size\_t @var{length}})

The function @code{gpgme\_data\_read} reads up to @var{length} bytes from the data object with the handle @var{dh} into the space starting at @var{buffer}.

If no error occurs, the actual amount read is returned. If the end of the data object is reached, the function returns 0.

In all other cases, the function returns -1 and sets @var{errno}.

@end deftypefun

@deftypefun ssize\_t gpgme\_data\_write (@w{gpgme\_data\_t @var{dh}}, @w{const void \*@var{buffer}}, @w{size\_t @var{size}})

The function @code{gpgme\_data\_write} writes up to @var{size} bytes starting from @var{buffer} into the data object with the handle @var{dh} at the current write position.

The function returns the number of bytes actually written, or -1 if an error occurs. If an error occurs, @var{errno} is set.

@end deftypefun

@deftypefun off\_t gpgme\_data\_seek (@w{gpgme\_data\_t @var{dh}}, @w{off\_t @var{offset}}, @w{int @var{whence}})

The function @code{gpgme\_data\_seek} changes the current read/write position.

The @var{whence} argument specifies how the @var{offset} should be interpreted. It must be one of the following symbolic constants:

@table @code

@item SEEK\_SET

Specifies that @var{offset} is a count of characters from the beginning of the data object.

@item SEEK\_CUR

Specifies that @var{offset} is a count of characters from the current file position. This count may be positive or negative.

@item SEEK\_END

Specifies that @var{offset} is a count of characters from the end of the data object. A negative count specifies a position within the current extent of the data object; a positive count specifies a position past the current end. If you set the position past the current end, and actually write data, you will extend the data object with zeros up to that position.

@end table

If successful, the function returns the resulting file position, measured in bytes from the beginning of the data object. You can use this feature together with @code{SEEK\_CUR} to read the current read/write position.

If the function fails, -1 is returned and @var{errno} is set.

@end deftypefun

@node Data Buffer Meta-Data

@subsection Data Buffer Meta-Data

@cindex data buffer, meta-data

@cindex data buffer, file name

@cindex data buffer, encoding

@deftypefun {char \*} gpgme\_data\_get\_file\_name (@w{gpgme\_data\_t @var{dh}})

@since{1.1.0}

The function @code{gpgme\_data\_get\_file\_name} returns a pointer to a string containing the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

If no error occurs, the string containing the file name is returned.

Otherwise, @code{NULL} will be returned.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_data\_set\_file\_name (@w{gpgme\_data\_t @var{dh}}, @w{const char \*@var{file\_name}})

@since{1.1.0}

The function @code{gpgme\_data\_set\_file\_name} sets the file name

associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

The function returns the error code `GPG_ERR_INV_VALUE` if `dh` is not a valid pointer and `GPG_ERR_ENOMEM` if not enough memory is available.

`@end deftypefun`

`@deftp {Data type} {enum gpgme_data_encoding_t}`

`@tindex gpgme_data_encoding_t`

The `gpgme_data_encoding_t` type specifies the encoding of a `gpgme_data_t` object. For input data objects, the encoding is useful to give the backend a hint on the type of data. For output data objects, the encoding can specify the output data format on certain operations. Please note that not all backends support all encodings on all operations. The following data types are available:

`@table @code`

`@item GPGME_DATA_ENCODING_NONE`

This specifies that the encoding is not known. This is the default for a new data object. The backend will try its best to detect the encoding automatically.

`@item GPGME_DATA_ENCODING_BINARY`

This specifies that the data is encoding in binary form; i.e. there is no special encoding.

`@item GPGME_DATA_ENCODING_BASE64`

This specifies that the data is encoded using the Base-64 encoding scheme as used by `MIME` and other protocols.

`@item GPGME_DATA_ENCODING_ARMOR`

This specifies that the data is encoded in an armored form as used by OpenPGP and PEM.

`@item GPGME_DATA_ENCODING_MIME`

`@since{1.7.0}`

This specifies that the data is encoded as a MIME part.

`@item GPGME_DATA_ENCODING_URL`

`@since{1.2.0}`

The data is a list of linefeed delimited URLs. This is only useful with `gpgme_op_import`.

@item GPGME\_DATA\_ENCODING\_URL0

@since{1.2.0}

The data is a list of binary zero delimited URLs. This is only useful with @code{gpgme\_op\_import}.

@item GPGME\_DATA\_ENCODING\_URLESC

@since{1.2.0}

The data is a list of linefeed delimited URLs with all control and space characters percent escaped. This mode is is not yet implemented.

@end table

@end deftp

@deftypefun gpgme\_data\_encoding\_t gpgme\_data\_get\_encoding (@w{gpgme\_data\_t @var{dh}})

The function @code{gpgme\_data\_get\_encoding} returns the encoding of the data object with the handle @var{dh}. If @var{dh} is not a valid pointer (e.g. @code{NULL}) @code{GPGME\_DATA\_ENCODING\_NONE} is returned.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_data\_set\_encoding (@w{gpgme\_data\_t @var{dh}}, gpgme\_data\_encoding\_t @var{enc})

The function @code{gpgme\_data\_set\_encoding} changes the encoding of the data object with the handle @var{dh} to @var{enc}.

@end deftypefun

@deftypefun {gpgme\_error\_t} gpgme\_data\_set\_flag @

(@w{gpgme\_data\_t @var{dh}}, @

@w{const char \*@var{name}}, @

@w{const char \*@var{value}})

@since{1.7.0}

Some minor properties of the data object can be controlled with flags set by this function. The properties are identified by the following values for @var{name}:

@table @code

@item size-hint

The value is a decimal number with the length gpgme shall assume for this data object. This is useful if the data is provided by callbacks or via file descriptors but the applications knows the total size of the data. If this is set the OpenPGP engine may use this to decide on buffer allocation strategies and to provide a total value for its progress information.

@end table

This function returns @code{0} on success.

@end deftypefun

@node Data Buffer Convenience

@subsection Data Buffer Convenience Functions

@cindex data buffer, convenience

@cindex type of data

@cindex identify

@deftp {Data type} {enum gpgme\_data\_type\_t}

@tindex gpgme\_data\_type\_t

@since{1.4.3}

The @code{gpgme\_data\_type\_t} type is used to return the detected type of the content of a data buffer.

@end deftp

@table @code

@item GPGME\_DATA\_TYPE\_INVALID

This is returned by @code{gpgme\_data\_identify} if it was not possible to identify the data. Reasons for this might be a non-seekable stream or a memory problem. The value is 0.

@item GPGME\_DATA\_TYPE\_UNKNOWN

The type of the data is not known.

@item GPGME\_DATA\_TYPE\_PGP\_SIGNED

The data is an OpenPGP signed message. This may be a binary signature, a detached one or a cleartext signature.

@item GPGME\_DATA\_TYPE\_PGP\_ENCRYPTED

@since{1.7.0}

The data is an OpenPGP encrypted message.

@item GPGME\_DATA\_TYPE\_PGP\_SIGNATURE

@since{1.7.0}

The data is an OpenPGP detached signature.

@item GPGME\_DATA\_TYPE\_PGP\_OTHER

This is a generic OpenPGP message. In most cases this will be encrypted data.

@item GPGME\_DATA\_TYPE\_PGP\_KEY

This is an OpenPGP key (private or public).

@item GPGME\_DATA\_TYPE\_CMS\_SIGNED

This is a CMS signed message.

@item GPGME\_DATA\_TYPE\_CMS\_ENCRYPTED

This is a CMS encrypted (enveloped data) message.

@item GPGME\_DATA\_TYPE\_CMS\_OTHER

This is used for other CMS message types.

@item GPGME\_DATA\_TYPE\_X509\_CERT

The data is a X.509 certificate

@item GPGME\_DATA\_TYPE\_PKCS12

The data is a PKCS#12 message. This is commonly used to exchange private keys for X.509.

@end table

@deftypefun gpgme\_data\_type\_t gpgme\_data\_identify (@w{gpgme\_data\_t @var{dh}})

@since{1.4.3}

The function @code{gpgme\_data\_identify} returns the type of the data with the handle @var{dh}. If it is not possible to perform the identification, the function returns zero

(@code{GPGME\_DATA\_TYPE\_INVALID}). Note that depending on how the data object has been created the identification may not be possible or the data object may change its internal state (file pointer moved). For file or memory based data object, the state should not change.

@end deftypefun

@c

@c Chapter Contexts

@c

@node Contexts

@chapter Contexts

@cindex context

All cryptographic operations in @acronym{GPGME} are performed within a context, which contains the internal state of the operation as well as configuration parameters. By using several contexts you can run several cryptographic operations in parallel, with different configuration.

@deftp {Data type} {gpgme\_ctx\_t}

The @code{gpgme\_ctx\_t} type is a handle for a @acronym{GPGME} context, which is used to hold the configuration, status and result of cryptographic operations.

@end deftp

@menu

- \* Creating Contexts:: Creating new @acronym{GPGME} contexts.
- \* Destroying Contexts:: Releasing @acronym{GPGME} contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with @acronym{GPGME}.
- \* Trust Item Management:: Managing trust items with @acronym{GPGME}.
- \* Crypto Operations:: Using a context for cryptography.

\* Miscellaneous::           Miscellaneous operations  
\* Run Control::            Controlling how operations are run.  
@end menu

@node Creating Contexts  
@section Creating Contexts  
@cindex context, creation

@deftypefun gpgme\_error\_t gpgme\_new (@w{gpgme\_ctx\_t \*}@var{ctx})  
The function @code{gpgme\_new} creates a new @code{gpgme\_ctx\_t} object and returns a handle for it in @var{ctx}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the context was successfully created, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if not enough memory is available. Also, it returns @code{GPG\_ERR\_NOT\_OPERATIONAL} if @code{gpgme\_check\_version} was not called to initialize GPGME, and @code{GPG\_ERR\_SELFTEST\_FAILED} if a selftest failed. Currently, the only selftest is for Windows MingW32 targets to see if @code{-mms-bitfields} was used (as required).  
@end deftypefun

@node Destroying Contexts  
@section Destroying Contexts  
@cindex context, destruction

@deftypefun void gpgme\_release (@w{gpgme\_ctx\_t @var{ctx}})  
The function @code{gpgme\_release} destroys the context with the handle @var{ctx} and releases all associated resources.  
@end deftypefun

@node Result Management  
@section Result Management  
@cindex context, result of operation

The detailed result of an operation is returned in operation-specific structures such as @code{gpgme\_decrypt\_result\_t}. The corresponding retrieval functions such as @code{gpgme\_op\_decrypt\_result} provide static access to the results after an operation completes. Those structures shall be considered read-only and an application must not allocate such a structure on its own. The following interfaces make it possible to detach a result structure from its associated context and give it a lifetime beyond that of the current operation or context.

```
@deftypefun void gpgme_result_ref (@w{void *@var{result}})
@since{1.2.0}
```

The function `gpgme_result_ref` acquires an additional reference for the result `@var{result}`, which may be of any type `gpgme_*_result_t`. As long as the user holds a reference, the result structure is guaranteed to be valid and unmodified.

```
@end deftypefun
```

```
@deftypefun void gpgme_result_unref (@w{void *@var{result}})
@since{1.2.0}
```

The function `gpgme_result_unref` releases a reference for the result `@var{result}`. If this was the last reference, the result structure will be destroyed and all resources associated to it will be released.

```
@end deftypefun
```

Note that a context may hold its own references to result structures, typically until the context is destroyed or the next operation is started. In fact, these references are accessed through the `gpgme_op_*_result` functions.

```
@node Context Attributes
@section Context Attributes
@cindex context, attributes
```

```
@menu
* Protocol Selection::      Selecting the protocol used by a context.
* Crypto Engine::          Configuring the crypto engine.
* Setting the Sender::     How to tell the engine the sender.
* ASCII Armor::           Requesting @acronym{ASCII} armored output.
* Text Mode::              Choosing canonical text mode.
* Offline Mode::           Choosing offline mode.
* Pinentry Mode::          Choosing the pinentry mode.
* Included Certificates::  Including a number of certificates.
* Key Listing Mode::       Selecting key listing mode.
* Passphrase Callback::    Getting the passphrase from the user.
* Progress Meter Callback:: Being informed about the progress.
* Status Message Callback:: Status messages received from gpg.
* Context Flags::          Additional flags for a context.
* Locale::                 Setting the locale of a context.
* Additional Logs::        Additional logs of a context.
@end menu
```

```
@node Protocol Selection
```

@subsection Protocol Selection

@cindex context, selecting protocol

@cindex protocol, selecting

```
@deftypefun gpgme_error_t gpgme_set_protocol (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_protocol_t @var{proto}})
```

The function `gpgme_set_protocol` sets the protocol used within the context `@var{ctx}` to `@var{proto}`. All crypto operations will be performed by the crypto engine configured for that protocol.

[@xref{Protocols and Engines}](#).

Setting the protocol with `gpgme_set_protocol` does intentionally not check if the crypto engine for that protocol is available and installed correctly. [@xref{Engine Version Check}](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the protocol could be set successfully, and `GPG_ERR_INV_VALUE` if `@var{protocol}` is not a valid protocol.

```
@end deftypefun
```

```
@deftypefun gpgme_protocol_t gpgme_get_protocol (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_get_protocol` retrieves the protocol currently use with the context `@var{ctx}`.

```
@end deftypefun
```

@node Crypto Engine

@subsection Crypto Engine

@cindex context, configuring engine

@cindex engine, configuration per context

The following functions can be used to set and retrieve the configuration of the crypto engines of a specific context. The default can also be retrieved without any particular context.

[@xref{Engine Information}](#). The default can also be changed globally.

[@xref{Engine Configuration}](#).

```
@deftypefun gpgme_engine_info_t gpgme_ctx_get_engine_info (@w{gpgme_ctx_t @var{ctx}})
@since{1.1.0}
```

The function `gpgme_ctx_get_engine_info` returns a linked list of engine info structures. Each info structure describes the configuration of one configured backend, as used by the context `@var{ctx}`.

The result is valid until the next invocation of

`gpgme_ctx_set_engine_info` for this particular context.

This function can not fail.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_ctx_set_engine_info (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_protocol_t
@var{proto}}, @w{const char *@var{file_name}}, @w{const char *@var{home_dir}})
@since{1.1.0}
```

The function @code{gpgme\_ctx\_set\_engine\_info} changes the configuration of the crypto engine implementing the protocol @var{proto} for the context @var{ctx}.

@var{file\_name} is the file name of the executable program implementing this protocol, and @var{home\_dir} is the directory name of the configuration directory for this crypto engine. If @var{home\_dir} is @code{NULL}, the engine's default will be used.

Currently this function must be used before starting the first crypto operation. It is unspecified if and when the changes will take effect if the function is called after starting the first operation on the context @var{ctx}.

This function returns the error code @code{GPG\_ERR\_NO\_ERROR} if successful, or an error code on failure.

@end deftypefun

@node Setting the Sender

@subsection How to tell the engine the sender.

@cindex context, sender

@cindex sender

@cindex From:

Some engines can make use of the senders address, for example to figure out the best user id in certain trust models. For verification and signing of mails, it is thus suggested to let the engine know the sender ("From:") address. @acronym{GPGME} provides two functions to accomplish that. Note that the esoteric use of multiple "From:" addresses is not supported.

```
@deftypefun gpgme_error_t gpgme_set_sender @
(@w{gpgme_ctx_t @var{ctx}}, @
@w{int @var{address}})
```

@since{1.8.0}

The function @code{gpgme\_set\_sender} specifies the sender address for use in sign and verify operations. @var{address} is expected to be the ``addr-spec" part of an address but may also be a complete mailbox

address, in which case this function extracts the ``addr-spec" from it. Using `{NULL}` for `{address}` clears the sender address.

The function returns 0 on success or an error code on failure. The most likely failure is that no valid ``addr-spec" was found in `{address}`.

@end deftypefun

```
@deftypefun @w{const char *} gpgme_get_sender @
  (@w{gpgme_ctx_t @var{ctx}})
```

@since{1.8.0}

The function `{gpgme_get_sender}` returns the current sender address from the context, or NULL if none was set. The returned value is valid as long as the `{ctx}` is valid and `{gpgme_set_sender}` has not been called again.

@end deftypefun

@c FIXME: Unfortunately, using @acronym here breaks texi2dvi.

@node ASCII Armor

@subsection @acronym{ASCII} Armor

@cindex context, armor mode

@cindex @acronym{ASCII} armor

@cindex armor mode

```
@deftypefun void gpgme_set_armor (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{yes}})
```

The function `{gpgme_set_armor}` specifies if the output should be @acronym{ASCII} armored. By default, output is not @acronym{ASCII} armored.

@acronym{ASCII} armored output is disabled if `{yes}` is zero, and enabled otherwise.

@end deftypefun

```
@deftypefun int gpgme_get_armor (@w{gpgme_ctx_t @var{ctx}})
```

The function `{gpgme_get_armor}` returns 1 if the output is @acronym{ASCII} armored, and `{0}` if it is not, or if `{ctx}` is not a valid pointer.

@end deftypefun

@node Text Mode

@subsection Text Mode

@cindex context, text mode  
@cindex text mode  
@cindex canonical text mode

```
@deftypefun void gpgme_set_textmode (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{yes}})
```

The function `gpgme_set_textmode` specifies if canonical text mode should be used. By default, text mode is not used.

Text mode is for example used for the RFC2015 signatures; note that the updated RFC 3156 mandates that the mail user agent does some preparations so that text mode is not needed anymore.

This option is only relevant to the OpenPGP crypto engine, and ignored by all other engines.

Canonical text mode is disabled if `@var{yes}` is zero, and enabled otherwise.

```
@end deftypefun
```

```
@deftypefun int gpgme_get_textmode (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_get_textmode` returns 1 if canonical text mode is enabled, and `0` if it is not, or if `@var{ctx}` is not a valid pointer.

```
@end deftypefun
```

@node Offline Mode  
@subsection Offline Mode  
@cindex context, offline mode  
@cindex offline mode

```
@deftypefun void gpgme_set_offline (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{yes}})  
@since{1.6.0}
```

The function `gpgme_set_offline` specifies if offline mode should be used. Offline mode is disabled if `@var{yes}` is zero, and enabled otherwise. By default, offline mode is disabled.

The details of the offline mode depend on the used protocol and its backend engine. It may eventually be extended to be more stricter and for example completely disable the use of Dirmngr for any engine.

For the CMS protocol the offline mode specifies whether Dirmngr shall be used to do additional validation that might require connecting external services (e.g. CRL / OCSP checks). Here the offline mode only affects the keylist mode `GPGME_KEYLIST_MODE_VALIDATE`.

For the OpenPGP protocol offline mode entirely disables the use of the

Dirmngr and will thus guarantee that no network connections are done as part of an operation on this context. It has only an effect with GnuPG versions 2.1.23 or later.

For all other protocols the offline mode is currently ignored.

@end deftypefun

```
@deftypefun int gpgme_get_offline (@w{gpgme_ctx_t @var{ctx}})
@since{1.6.0}
```

The function @code{gpgme\_get\_offline} returns 1 if offline mode is enabled, and @code{0} if it is not, or if @var{ctx} is not a valid pointer.

@end deftypefun

@node Pinentry Mode

@subsection Pinentry Mode

@cindex context, pinentry mode

@cindex pinentry mode

```
@deftypefun gpgme_error_t gpgme_set_pinentry_mode (@w{gpgme_ctx_t @var{ctx}},
@w{gpgme_pinentry_mode_t @var{mode}})
```

@since{1.4.0}

The function @code{gpgme\_set\_pinentry\_mode} specifies the pinentry mode to be used.

For GnuPG >= 2.1 this option is required to be set to

@code{GPGME\_PINENTRY\_MODE\_LOOPBACK} to enable the passphrase callback mechanism in GPGME through @code{gpgme\_set\_passphrase\_cb}.

@end deftypefun

```
@deftypefun gpgme_pinentry_mode_t gpgme_get_pinentry_mode (@w{gpgme_ctx_t @var{ctx}})
@since{1.4.0}
```

The function @code{gpgme\_get\_pinentry\_mode} returns the mode set for the context.

@end deftypefun

@deftp {Data type} {enum gpgme\_pinentry\_mode\_t}

@tindex gpgme\_pinentry\_mode\_t

@since{1.4.0}

The @code{gpgme\_minentry\_mode\_t} type specifies the set of possible pinentry modes that are supported by @acronym{GPGME} if GnuPG >= 2.1 is used.

The following modes are supported:

```
@table @code
@item GPGME_PINENTRY_MODE_DEFAULT
@since{1.4.0}
```

Use the default of the agent, which is ask.

```
@item GPGME_PINENTRY_MODE_ASK
@since{1.4.0}
```

Force the use of the Pinentry.

```
@item GPGME_PINENTRY_MODE_CANCEL
@since{1.4.0}
```

Emulate use of Pinentry's cancel button.

```
@item GPGME_PINENTRY_MODE_ERROR
@since{1.4.0}
```

Return a Pinentry error @code{No Pinentry}.

```
@item GPGME_PINENTRY_MODE_LOOPBACK
@since{1.4.0}
```

Redirect Pinentry queries to the caller.

This enables the use of @code{gpgme\_set\_passphrase\_cb} because pinentry queries are redirected to gpgme.

Note: For 2.1.0 - 2.1.12 this mode requires @code{allow-loopback-pinentry} to be enabled in the @file{gpg-agent.conf} or an agent started with that option.

```
@end table
@end deftp
```

```
@node Included Certificates
@subsection Included Certificates
@cindex certificates, included
```

```
@deftypefun void gpgme_set_include_certs (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{nr_of_certs}})
```

The function @code{gpgme\_set\_include\_certs} specifies how many certificates should be included in an S/MIME signed message. By default, only the sender's certificate is included. The possible values of @var{nr\_of\_certs} are:

```
@table @code
```

@item GPGME\_INCLUDE\_CERTS\_DEFAULT

@since{1.0.3}

Fall back to the default of the crypto backend. This is the default for GPGME.

@item -2

Include all certificates except the root certificate.

@item -1

Include all certificates.

@item 0

Include no certificates.

@item 1

Include the sender's certificate only.

@item n

Include the first n certificates of the certificates path, starting from the sender's certificate. The number @code{n} must be positive.

@end table

Values of @var{nr\_of\_certs} smaller than -2 are undefined.

This option is only relevant to the CMS crypto engine, and ignored by all other engines.

@end deftypefun

@deftypefun int gpgme\_get\_include\_certs (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_get\_include\_certs} returns the number of certificates to include into an S/MIME signed message.

@end deftypefun

@node Key Listing Mode

@subsection Key Listing Mode

@cindex key listing mode

@cindex key listing, mode of

@deftypefun gpgme\_error\_t gpgme\_set\_keylist\_mode (@w{gpgme\_ctx\_t @var{ctx}},

@w{gpgme\_keylist\_mode\_t @var{mode}})

The function @code{gpgme\_set\_keylist\_mode} changes the default behaviour of the key listing functions. The value in @var{mode} is a bitwise-or combination of one or multiple of the following bit values:

@table @code

@item GPGME\_KEYLIST\_MODE\_LOCAL

The @code{GPGME\_KEYLIST\_MODE\_LOCAL} symbol specifies that the local keyring should be searched for keys in the keylisting operation. This is the default.

Using only this option results in a @code{--list-keys}.

#### @item GPGME\_KEYLIST\_MODE\_EXTERN

The `{GPGME_KEYLIST_MODE_EXTERN}` symbol specifies that an external source should be searched for keys in the keylisting operation. The type of external source is dependent on the crypto engine used and whether it is combined with `{GPGME_KEYLIST_MODE_LOCAL}`. For example, it can be a remote keyserver or LDAP certificate server.

Using only this option results in a `{--search-keys}` for `{GPGME_PROTOCOL_OpenPGP}` and something similar to `{--list-external-keys}` for `{GPGME_PROTOCOL_CMS}`.

#### @item GPGME\_KEYLIST\_MODE\_LOCATE

This is a shortcut for the combination of `{GPGME_KEYLIST_MODE_LOCAL}` and `{GPGME_KEYLIST_MODE_EXTERN}`, which results in a `{--locate-keys}` for `{GPGME_PROTOCOL_OpenPGP}`.

#### @item GPGME\_KEYLIST\_MODE\_SIGS

The `{GPGME_KEYLIST_MODE_SIGS}` symbol specifies that the key signatures should be included in the listed keys.

#### @item GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS

@since{1.1.1}

The `{GPGME_KEYLIST_MODE_SIG_NOTATIONS}` symbol specifies that the signature notations on key signatures should be included in the listed keys. This only works if `{GPGME_KEYLIST_MODE_SIGS}` is also enabled.

#### @item GPGME\_KEYLIST\_MODE\_WITH\_TOFU

@since{1.7.0}

The `{GPGME_KEYLIST_MODE_WITH_TOFU}` symbol specifies that information pertaining to the TOFU trust model should be included in the listed keys.

#### @item GPGME\_KEYLIST\_MODE\_WITH\_SECRET

@since{1.5.1}

The `{GPGME_KEYLIST_MODE_WITH_SECRET}` returns information about the presence of a corresponding secret key in a public key listing. A public key listing with this mode is slower than a standard listing but can be used instead of a second run to list the secret keys. This is only supported for GnuPG versions  $\geq 2.1$ .

#### @item GPGME\_KEYLIST\_MODE\_EPHEMERAL

@since{1.2.0}

The `GPGME_KEYLIST_MODE_EPHEMERAL` symbol specifies that keys flagged as ephemeral are included in the listing.

`GPGME_KEYLIST_MODE_VALIDATE`  
@since{0.4.5}

The `GPGME_KEYLIST_MODE_VALIDATE` symbol specifies that the backend should do key or certificate validation and not just get the validity information from an internal cache. This might be an expensive operation and is in general not useful. Currently only implemented for the S/MIME backend and ignored for other backends.

@end table

At least one of `GPGME_KEYLIST_MODE_LOCAL` and `GPGME_KEYLIST_MODE_EXTERN` must be specified. For future binary compatibility, you should get the current mode with `gpgme_get_keylist_mode` and modify it by setting or clearing the appropriate bits, and then using that calculated value in the `gpgme_set_keylisting_mode` operation. This will leave all other bits in the mode value intact (in particular those that are not used in the current version of the library).

The function returns the error code `GPG_ERR_NO_ERROR` if the mode could be set correctly, and `GPG_ERR_INV_VALUE` if `ctx` is not a valid pointer or `mode` is not a valid mode.  
@end deftypefun

@deftypefun gpgme\_keylist\_mode\_t gpgme\_get\_keylist\_mode (@w{gpgme\_ctx\_t} @var{ctx})

The function `gpgme_get_keylist_mode` returns the current key listing mode of the context `ctx`. This value can then be modified and used in a subsequent `gpgme_set_keylist_mode` operation to only affect the desired bits (and leave all others intact).

The function returns 0 if `ctx` is not a valid pointer, and the current mode otherwise. Note that 0 is not a valid mode value.  
@end deftypefun

@node Passphrase Callback  
@subsection Passphrase Callback  
@cindex callback, passphrase  
@cindex passphrase callback

@deftp {Data type} {gpgme\_error\_t (\*gpgme\_passphrase\_cb\_t)(void \*@var{hook}, const char \*@var{uid\_hint}, const char \*@var{passphrase\_info}, @w{int} @var{prev\_was\_bad}), @w{int} @var{fd})}

@tindex gpgme\_passphrase\_cb\_t

The @code{gpgme\_passphrase\_cb\_t} type is the type of functions usable as passphrase callback function.

The argument @var{uid\_hint} might contain a string that gives an indication for which user ID the passphrase is required. If this is not available, or not applicable (in the case of symmetric encryption, for example), @var{uid\_hint} will be @code{NULL}.

The argument @var{passphrase\_info}, if not @code{NULL}, will give further information about the context in which the passphrase is required. This information is engine and operation specific.

If this is the repeated attempt to get the passphrase, because previous attempts failed, then @var{prev\_was\_bad} is 1, otherwise it will be 0.

The user must write the passphrase, followed by a newline character, to the file descriptor @var{fd}. The function @code{gpgme\_io\_writen} should be used for the write operation. Note that if the user returns 0 to indicate success, the user must at least write a newline character before returning from the callback.

If an error occurs, return the corresponding @code{gpgme\_error\_t} value. You can use the error code @code{GPG\_ERR\_CANCELED} to abort the operation. Otherwise, return @code{0}.

Note: The passphrase\_cb only works with GnuPG 1.x and 2.1.x and not with the 2.0.x series. See @code{gpgme\_set\_pinentry\_mode} for more details on 2.1.x usage.

@end deftp

```
@deftypefun void gpgme_set_passphrase_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_passphrase_cb_t @var{passfunc}}, @w{void *@var{hook_value}})
```

The function @code{gpgme\_set\_passphrase\_cb} sets the function that is used when a passphrase needs to be provided by the user to @var{passfunc}. The function @var{passfunc} needs to be implemented by the user, and whenever it is called, it is called with its first argument being @var{hook\_value}. By default, no passphrase callback function is set.

Not all crypto engines require this callback to retrieve the passphrase. It is better if the engine retrieves the passphrase from a trusted agent (a daemon process), rather than having each user to implement their own passphrase query. Some engines do not even support an external passphrase callback at all, in this case the error code @code{GPG\_ERR\_NOT\_SUPPORTED} is returned.

For GnuPG >= 2.1 the pinentry mode has to be set to `GPGME_PINENTRY_MODE_LOOPBACK` to enable the passphrase callback. See `gpgme_set_pinentry_mode`.

The user can disable the use of a passphrase callback function by calling `gpgme_set_passphrase_cb` with `passfunc` being `NULL`.

```
@end deftypefun
```

```
@deftypefun void gpgme_get_passphrase_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_passphrase_cb_t *@var{passfunc}}, @w{void **@var{hook_value}})
```

The function `gpgme_get_passphrase_cb` returns the function that is used when a passphrase needs to be provided by the user in `passfunc`, and the first argument for this function in `hook_value`. If no passphrase callback is set, or `ctx` is not a valid pointer, `NULL` is returned in both variables.

`passfunc` or `hook_value` can be `NULL`. In this case, the corresponding value will not be returned.

```
@end deftypefun
```

```
@node Progress Meter Callback
```

```
@subsection Progress Meter Callback
```

```
@cindex callback, progress meter
```

```
@cindex progress meter callback
```

```
@deftp {Data type} {void (*gpgme_progress_cb_t)(void *@var{hook}, const char *@var{what}, int @var{type}, int @var{current}, int @var{total})}
```

```
@tindex gpgme_progress_cb_t
```

The `gpgme_progress_cb_t` type is the type of functions usable as progress callback function.

The arguments are specific to the crypto engine. More information about the progress information returned from the GnuPG engine can be found in the GnuPG source code in the file `doc/DETAILS` in the section `PROGRESS`.

```
@end deftp
```

```
@deftypefun void gpgme_set_progress_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_progress_cb_t @var{progfunc}}, @w{void **@var{hook_value}})
```

The function `gpgme_set_progress_cb` sets the function that is used when progress information about a cryptographic operation is available. The function `progfunc` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `hook_value`. By default, no progress callback function is set.

Setting a callback function allows an interactive program to display progress information about a long operation to the user.

The user can disable the use of a progress callback function by calling `gpgme_set_progress_cb` with `progfunc` being `NULL`.

```
@end deftypefun
```

```
@deftypefun void gpgme_get_progress_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_progress_cb_t *@var{progfunc}}, @w{void **@var{hook_value}})
```

The function `gpgme_get_progress_cb` returns the function that is used to inform the user about the progress made in `*progfunc`, and the first argument for this function in `*hook_value`. If no progress callback is set, or `ctx` is not a valid pointer, `NULL` is returned in both variables.

`progfunc` or `hook_value` can be `NULL`. In this case, the corresponding value will not be returned.

```
@end deftypefun
```

```
@node Status Message Callback
@subsection Status Message Callback
@cindex callback, status message
@cindex status message callback
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_status_cb_t)(void *@var{hook}, const char *@var{keyword}, const char *@var{args})}
```

```
@tindex gpgme_status_cb_t
```

The `gpgme_status_cb_t` type is the type of function usable as a status message callback function.

The argument `keyword` is the name of the status message while the `args` argument contains any arguments for the status message.

If an error occurs, return the corresponding `gpgme_error_t` value. Otherwise, return `0`.

```
@end deftp
```

```
@deftypefun void gpgme_set_status_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_status_cb_t @var{statusfunc}}, @w{void **@var{hook_value}})
@since{1.6.0}
```

The function `gpgme_set_status_cb` sets the function that is used when a status message is received from gpg to `statusfunc`. The function `statusfunc` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `hook_value`. By default, no status message callback function is set.

The user can disable the use of a status message callback function by calling `gpgme_set_status_cb` with `statusfunc` being `NULL`.

```
@deftypefun void gpgme_get_status_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_status_cb_t
*@var{statusfunc}}, @w{void **@var{hook_value}})
@since{1.6.0}
```

The function `gpgme_get_status_cb` returns the function that is used to process status messages from gpg in `*statusfunc`, and the first argument for this function in `*hook_value`. If no status message callback is set, or `ctx` is not a valid pointer, `NULL` is returned in both variables.

```
@end deftypefun
```

**Context Flags**

**Context Flags**

flags, of a context

```
@deftypefun {gpgme_error_t} gpgme_set_ctx_flag @
(@w{gpgme_ctx_t @var{ctx}}, @
@w{const char *@var{name}}, @
@w{const char *@var{value}})
```

```
@since{1.7.0}
```

Some minor properties of the context can be controlled with flags set by this function. The properties are identified by the following values for `name`:

**redraw**

"redraw"

This flag is normally not changed by the caller because GPGME sets and clears it automatically: The flag is cleared before an operation and set if an operation noticed that the engine has launched a Pinentry. A Curses based application may use this information to redraw the screen; for example:

**Example**

```
err = gpgme_op_keylist_start (ctx, "foo@@example.org", 0);
while (!err)
@{
err = gpgme_op_keylist_next (ctx, &key);
if (err)
break;
show_key (key);
gpgme_key_release (key);
```

```
@}  
if ((s = gpgme_get_ctx_flag (ctx, "redraw")) && *s)  
    redraw_screen ();  
gpgme_release (ctx);  
@end example
```

#### @item "full-status"

Using a `@var{value}` of "1" the status callback set by `gpgme_set_status_cb` returns all status lines with the exception of PROGRESS lines. With the default of "0" the status callback is only called in certain situations.

#### @item "raw-description"

Setting the `@var{value}` to "1" returns human readable strings in a raw format. For example the non breaking space characters ("~") will not be removed from the `@code{description}` field of the `@code{gpgme_tofu_info_t}` object.

#### @item "export-session-key"

Using a `@var{value}` of "1" specifies that the context should try to export the symmetric session key when decrypting data. By default, or when using an empty string or "0" for `@var{value}`, session keys are not exported.

#### @item "override-session-key"

The string given in `@var{value}` is passed to the GnuPG engine to override the session key for decryption. The format of that session key is specific to GnuPG and can be retrieved during a decrypt operation when the context flag "export-session-key" is enabled. Please be aware that using this feature with GnuPG < 2.1.16 will leak the session key on many platforms via `ps(1)`.

#### @item "auto-key-retrieve"

Setting the `@var{value}` to "1" asks the backend to automatically retrieve a key for signature verification if possible. Note that this option makes a "web bug" like behavior possible. Keyserver or Web Key Directory operators can see which keys you request, so by sending you a message signed by a brand new key (which you naturally will not have on your local keyring), the operator can tell both your IP address and the time when you verified the signature.

#### @item "request-origin"

The string given in `@var{value}` is passed to the GnuPG engines to request restrictions based on the origin of the request. Valid values are documented in the GnuPG manual and the `gpg man` page under the option `@option{--request-origin}`. Requires at least GnuPG 2.2.6 to have an effect.

@item "no-symkey-cache"

For OpenPGP disable the passphrase cache used for symmetrical en- and decryption. This cache is based on the message specific salt value. Requires at least GnuPG 2.2.7 to have an effect.

@item "ignore-mdc-error"

This flag passes the option @option{--ignore-mdc-error} to gpg. This can be used to force decryption of a message which failed due to a missing integrity check. This flag must be used with great caution and only if it is a known non-corrupted old message and the decryption result of the former try had the decryption result flag @code{legacy\_cipher\_nomdc} set. For failsafe reasons this flag is reset after each operation.

@item "auto-key-locate"

The string given in @var{value} is passed to gpg. This can be used to change the behavior of a @code{GPGME\_KEYLIST\_MODE\_LOCATE} keylisting. Valid values are documented in the GnuPG manual and the gpg man page under the option @option{--auto-key-locate}. Requires at least GnuPG 2.1.18.

Note: Keys retrieved through @code{auto-key-locate} are automatically imported in the keyring.

@item trust-model

@since{1.11.2}

Change the trust-model for all GnuPG engine operations. An empty string sets the trust-model back to the users default. If the trust-model is not supported by GnuPG the behavior is undefined and will likely cause all operations to fail. Example: "tofu+pgp".

This options should be used carefully with a strict version requirement. In some versions of GnuPG setting the trust-model changes the default trust-model for future operations. A change in the trust-model also can have unintended side effects, like rebuilding the trust-db.

@end table

This function returns @code{0} on success.

@end deffun

@deffun {const char \*} gpgme\_get\_ctx\_flag @

(@w{gpgme\_ctx\_t @var{ctx}}, @

@w{const char \*@var{name}})

@since{1.8.0}

The value of flags settable by @code{gpgme\_set\_ctx\_flag} can be retrieved by this function. If @var{name} is unknown the function returns @code{NULL}. For boolean flags an empty string is returned for False and the string "1" is returned for True; either atoi(3) or a test for an empty string can be used to get the boolean value.

@end deftypefun

@node Locale

@subsection Locale

@cindex locale, default

@cindex locale, of a context

A locale setting can be associated with a context. This locale is passed to the crypto engine, and used for applications like the PIN entry, which is displayed to the user when entering a passphrase is required.

The default locale is used to initialize the locale setting of all contexts created afterwards.

```
@deftypefun gpgme_error_t gpgme_set_locale (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{category}},  
@w{const char *@var{value}})  
@since{0.4.3}
```

The function @code{gpgme\_set\_locale} sets the locale of the context @var{ctx}, or the default locale if @var{ctx} is a null pointer.

The locale settings that should be changed are specified by @var{category}. Supported categories are @code{LC\_CTYPE}, @code{LC\_MESSAGES}, and @code{LC\_ALL}, which is a wildcard you can use if you want to change all the categories at once.

The value to be used for the locale setting is @var{value}, which will be copied to @acronym{GPGME}'s internal data structures. @var{value} can be a null pointer, which disables setting the locale, and will make PIN entry and other applications use their default setting, which is usually not what you want.

Note that the settings are only used if the application runs on a text terminal, and that the settings should fit the configuration of the output terminal. Normally, it is sufficient to initialize the default value at startup.

The function returns an error if not enough memory is available.

@end dectypefun

@node Additional Logs

@subsection Additional Logs

@cindex auditlog, of the engine

@cindex auditlog

Additional logs can be associated with a context. These logs are engine specific and can be obtained with @code{gpgme\_op\_getauditlog}.

```
@deftypefun gpgme_error_t gpgme_op_getauditlog @
    (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{output}}, @
    @w{unsigned int @var{flags}})
@since{1.1.1}
```

The function @code{gpgme\_op\_getauditlog} is used to obtain additional logs as specified by @var{flags} into the @var{output} data. If

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if a log could be queried from the engine, and @code{GPG\_ERR\_NOT\_IMPLEMENTED} if the log specified in @var{flags} is not available for this engine. If no log is available @code{GPG\_ERR\_NO\_DATA} is returned.

The value in @var{flags} is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_AUDITLOG_DIAG
@since{1.11.2}
```

Obtain diagnostic output which would be written to @code{stderr} in interactive use of the engine. This can be used to provide additional diagnostic information in case of errors in other operations.

Note: If log-file has been set in the configuration the log will be empty and @code{GPG\_ERR\_NO\_DATA} will be returned.

Implemented for: @code{GPGME\_PROTOCOL\_OpenPGP}

```
@item GPGME_AUDITLOG_DEFAULT
@since{1.11.2}
```

This flag has the value 0 for compatibility reasons. Obtains additional information from the engine by issuing the @code{GETAUDITLOG} command. For @code{GPGME\_PROTOCOL\_CMS} this provides additional information about the X509 certificate chain.

Implemented for: @code{GPGME\_PROTOCOL\_CMS}

@item GPGME\_AUDITLOG\_HTML

@since{1.1.1}

Same as @code{GPGME\_AUDITLOG\_DEFAULT} but in HTML.

Implemented for: @code{GPGME\_PROTOCOL\_CMS}

@end table

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_getauditlog_start @
    (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{output}}, @
    @w{unsigned int @var{flags}})
@since{1.1.1}
```

This is the asynchronous variant of @code{gpgme\_op\_getauditlog}.

@end deftypefun

@node Key Management

@section Key Management

@cindex key management

Some of the cryptographic operations require that recipients or signers are specified. This is always done by specifying the respective keys that should be used for the operation. The following section describes how such keys can be selected and manipulated.

@menu

- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.
- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
- \* Advanced Key Editing:: Advanced key edit operation.

@end menu

@node Key objects

@subsection Key objects

The keys are represented in GPGME by structures which may only be read by the application but never be allocated or changed. They are valid as long as the key object itself is valid.

```
@deftp {Data type} gpgme_key_t
```

The `gpgme_key_t` type is a pointer to a key object. It has the following members:

```
@table @code
@item gpgme_keylist_mode_t keylist_mode
@since{0.9.0}
```

The keylist mode that was active when the key was retrieved.

```
@item unsigned int revoked : 1
This is true if the key is revoked.
```

```
@item unsigned int expired : 1
This is true if the key is expired.
```

```
@item unsigned int disabled : 1
This is true if the key is disabled.
```

```
@item unsigned int invalid : 1
This is true if the key is invalid. This might have several reasons,
for a example for the S/MIME backend, it will be set during key
listings if the key could not be validated due to missing
certificates or unmatched policies.
```

```
@item unsigned int can_encrypt : 1
This is true if the key (ie one of its subkeys) can be used for
encryption.
```

```
@item unsigned int can_sign : 1
This is true if the key (ie one of its subkeys) can be used to create
data signatures.
```

```
@item unsigned int can_certify : 1
This is true if the key (ie one of its subkeys) can be used to create
key certificates.
```

```
@item unsigned int can_authenticate : 1
@since{0.4.5}
```

This is true if the key (ie one of its subkeys) can be used for authentication.

@item unsigned int is\_qualified : 1

@since{1.1.0}

This is true if the key can be used for qualified signatures according to local government regulations.

@item unsigned int secret : 1

This is true if the key is a secret key. Note, that this will always be true even if the corresponding subkey flag may be false (offline/stub keys). This is only set if a listing of secret keys has been requested or if @code{GPGME\_KEYLIST\_MODE\_WITH\_SECRET} is active.

@item unsigned int origin : 5

@since{1.8.0}

Reserved for the origin of this key.

@item gpgme\_protocol\_t protocol

This is the protocol supported by this key.

@item char \*issuer\_serial

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the issuer serial.

@item char \*issuer\_name

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the issuer name.

@item char \*chain\_id

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the chain ID, which can be used to build the certificate chain.

@item gpgme\_validity\_t owner\_trust

If @code{protocol} is @code{GPGME\_PROTOCOL\_OpenPGP}, then this is the owner trust.

@item gpgme\_subkey\_t subkeys

This is a linked list with the subkeys of the key. The first subkey in the list is the primary key and usually available.

@item gpgme\_user\_id\_t uids

This is a linked list with the user IDs of the key. The first user ID in the list is the main (or primary) user ID.

@item char \*fpr

@since{1.7.0}

This field gives the fingerprint of the primary key. Note that

this is a copy of the fingerprint of the first subkey. For an incomplete key (for example from a verification result) a subkey may be missing but this field may be set nevertheless.

```
@item unsigned long last_update
@since{1.8.0}
```

Reserved for the time of the last update of this key.

```
@end table
@end deftp
```

```
@deftp {Data type} gpgme_subkey_t
@since{1.5.0}
```

The `gpgme_subkey_t` type is a pointer to a subkey structure. Subkeys are one component of a `gpgme_key_t` object. In fact, subkeys are those parts that contains the real information about the individual cryptographic keys that belong to the same key object. One `gpgme_key_t` can contain several subkeys. The first subkey in the linked list is also called the primary key.

The subkey structure has the following members:

```
@table @code
@item gpgme_subkey_t next
This is a pointer to the next subkey structure in the linked list, or
@code{NULL} if this is the last element.
```

```
@item unsigned int revoked : 1
This is true if the subkey is revoked.
```

```
@item unsigned int expired : 1
This is true if the subkey is expired.
```

```
@item unsigned int disabled : 1
This is true if the subkey is disabled.
```

```
@item unsigned int invalid : 1
This is true if the subkey is invalid.
```

```
@item unsigned int can_encrypt : 1
This is true if the subkey can be used for encryption.
```

```
@item unsigned int can_sign : 1
This is true if the subkey can be used to create data signatures.
```

@item unsigned int can\_certify : 1

This is true if the subkey can be used to create key certificates.

@item unsigned int can\_authenticate : 1

@since{0.4.5}

This is true if the subkey can be used for authentication.

@item unsigned int is\_qualified : 1

@since{1.1.0}

This is true if the subkey can be used for qualified signatures according to local government regulations.

@item unsigned int is\_de\_vs : 1

@since{1.8.0}

This is true if the subkey complies with the rules for classified information in Germany at the restricted level (VS-NfD). This are currently RSA keys of at least 2048 bits or ECDH/ECDSA keys using a Brainpool curve.

@item unsigned int secret : 1

This is true if the subkey is a secret key. Note that it will be false if the key is actually a stub key; i.e. a secret key operation is currently not possible (offline-key). This is only set if a listing of secret keys has been requested or if

@code{GPGME\_KEYLIST\_MODE\_WITH\_SECRET} is active.

@item gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm supported by this subkey.

@item unsigned int length

This is the length of the subkey (in bits).

@item char \*keyid

This is the key ID of the subkey in hexadecimal digits.

@item char \*fpr

This is the fingerprint of the subkey in hexadecimal digits, if available.

@item char \*keygrip

@since{1.7.0}

The keygrip of the subkey in hex digit form or @code{NULL} if not available.

@item long int timestamp

This is the creation timestamp of the subkey. This is -1 if the timestamp is invalid, and 0 if it is not available.

@item long int expires

This is the expiration timestamp of the subkey, or 0 if the subkey does not expire.

@item unsigned int is\_cardkey : 1

@since{1.2.0}

True if the secret key is stored on a smart card.

@item char \*card\_number

@since{1.2.0}

The serial number of a smart card holding this key or @code{NULL}.

@item char \*curve

For ECC algorithms the name of the curve.

@end table

@end deftp

@deftp {Data type} gpgme\_user\_id\_t

A user ID is a component of a @code{gpgme\_key\_t} object. One key can have many user IDs. The first one in the list is the main (or primary) user ID.

The user ID structure has the following members.

@table @code

@item gpgme\_user\_id\_t next

This is a pointer to the next user ID structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int revoked : 1

This is true if the user ID is revoked.

@item unsigned int invalid : 1

This is true if the user ID is invalid.

@item gpgme\_validity\_t validity

This specifies the validity of the user ID.

@item char \*uid

This is the user ID string.

@item char \*name

This is the name component of @code{uid}, if available.

@item char \*comment

This is the comment component of @code{uid}, if available.

@item char \*email

This is the email component of @code{uid}, if available.

@item char \*address;

The mail address (addr-spec from RFC-5322) of the user ID string.

This is general the same as the @code{email} part of this structure but might be slightly different. If no mail address is available

@code{NULL} is stored.

@item gpgme\_tofu\_info\_t tofu

@since{1.7.0}

If not @code{NULL} information from the TOFU database pertaining to this user id.

@item gpgme\_key\_sig\_t signatures

This is a linked list with the signatures on this user ID.

@item unsigned int origin : 5

@since{1.8.0}

Reserved for the origin of this user ID.

@item unsigned long last\_update

@since{1.8.0}

Reserved for the time of the last update of this user ID.

@end table

@end deftp

@deftp {Data type} gpgme\_tofu\_info\_t

@since{1.7.0}

The @code{gpgme\_tofu\_info\_t} type is a pointer to a tofu info structure. Tofu info structures are one component of a

@code{gpgme\_user\_id\_t} object, and provide information from the TOFU database pertaining to the user ID.

The tofu info structure has the following members:

@table @code

@item gpgme\_key\_sig\_t next

This is a pointer to the next tofu info structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int validity : 3

This is the TOFU validity. It can have the following values:

@table @code

@item 0

The value @code{0} indicates a conflict.

@item 1

The value @code{1} indicates a key without history.

@item 2

The value @code{2} indicates a key with too little history.

@item 3

The value @code{3} indicates a key with enough history for basic trust.

@item 4

The value @code{4} indicates a key with a lot of history.

@end table

@item unsigned int policy : 4

This is the TOFU policy, see @code{gpgme\_tofu\_policy\_t}.

@item unsigned short sigcount

This is the number of signatures seen for this binding (or @code{USHRT\_MAX} if there are more than that).

@item unsigned short encrcount

This is the number of encryptions done with this binding (or @code{USHRT\_MAX} if there are more than that).

@item unsigned long signfirst

Number of seconds since Epoch when the first signature was seen with this binding.

@item unsigned long signlast

Number of seconds since Epoch when the last signature was seen with this binding.

@item unsigned long encrfirst

Number of seconds since Epoch when the first encryption was done with this binding.

@item unsigned long enclast

Number of seconds since Epoch when the last encryption was done with this binding.

@item char \*description

A human-readable string summarizing the TOFU data (or NULL).

@end table

@end deftp

@deftp {Data type} gpgme\_key\_sig\_t

The @code{gpgme\_key\_sig\_t} type is a pointer to a key signature structure. Key signatures are one component of a @code{gpgme\_key\_t} object, and validate user IDs on the key in the OpenPGP protocol.

The signatures on a key are only available if the key was retrieved via a listing operation with the @code{GPGME\_KEYLIST\_MODE\_SIGS} mode enabled, because it can be expensive to retrieve all signatures of a key.

The signature notations on a key signature are only available if the key was retrieved via a listing operation with the @code{GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS} mode enabled, because it can be expensive to retrieve all signature notations.

The key signature structure has the following members:

@table @code

@item gpgme\_key\_sig\_t next

This is a pointer to the next key signature structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int revoked : 1

This is true if the key signature is a revocation signature.

@item unsigned int expired : 1

This is true if the key signature is expired.

@item unsigned int invalid : 1

This is true if the key signature is invalid.

@item unsigned int exportable : 1

This is true if the key signature is exportable.

@item gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm used to create the signature.

@item char \*keyid

This is the key ID of the key (in hexadecimal digits) used to create the signature.

@item long int timestamp

This is the creation timestamp of the key signature. This is -1 if the timestamp is invalid, and 0 if it is not available.

@item long int expires

This is the expiration timestamp of the key signature, or 0 if the key signature does not expire.

@item gpgme\_error\_t status

This is the status of the signature and has the same meaning as the member of the same name in a @code{gpgme\_signature\_t} object.

@item unsigned int sig\_class

This specifies the signature class of the key signature. The meaning is specific to the crypto engine.

@item char \*uid

This is the main user ID of the key used to create the signature.

@item char \*name

This is the name component of @code{uid}, if available.

@item char \*comment

This is the comment component of @code{uid}, if available.

@item char \*email

This is the email component of @code{uid}, if available.

@item gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

@end table

@end deftp

@node Listing Keys

@subsection Listing Keys

@cindex listing keys

@cindex key listing

@cindex key listing, start

@cindex key ring, list  
@cindex key ring, search

```
@deftypefun gpgme_error_t gpgme_op_keylist_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{pattern}}, @w{int @var{secret_only}})
```

The function `gpgme_op_keylist_start` initiates a key listing operation inside the context `@var{ctx}`. It sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys in the list.

If `@var{pattern}` is `NULL`, all available keys are returned. Otherwise, `@var{pattern}` contains an engine specific expression that is used to limit the list to all keys matching the pattern. Note that the total length of the pattern is restricted to an engine-specific maximum (a couple of hundred characters are usually accepted). The pattern should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If `@var{secret_only}` is not `0`, the list is restricted to secret keys only.

The context will be busy until either all keys are received (and `gpgme_op_keylist_next` returns `GPG_ERR_EOF`), or `gpgme_op_keylist_end` is called to finish the operation.

The function returns the error code `GPG_ERR_INV_VALUE` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_keylist_ext_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{pattern}}[], @w{int @var{secret_only}}, @w{int @var{reserved}})
```

The function `gpgme_op_keylist_ext_start` initiates an extended key listing operation inside the context `@var{ctx}`. It sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys in the list.

If `@var{pattern}` or `@var{*pattern}` is `NULL`, all available keys are returned. Otherwise, `@var{pattern}` is a `NULL` terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim. Note that the total length of all patterns is restricted to an engine-specific maximum (the exact limit also depends on the number of patterns and amount of quoting required, but a couple of hundred characters are usually accepted). Patterns should be used to restrict the search to a certain common

name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If `@var{secret_only}` is not `@code{0}`, the list is restricted to secret keys only.

The value of `@var{reserved}` must be `@code{0}`.

The context will be busy until either all keys are received (and `@code{gpgme_op_keylist_next}` returns `@code{GPG_ERR_EOF}`), or `@code{gpgme_op_keylist_end}` is called to finish the operation.

The function returns the error code `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

@end dectyfefun

```
@dectyfefun gpgme_error_t gpgme_op_keylist_from_data_start @
    (@w{gpgme_ctx_t @var{ctx}}, @
     @w{gpgme_data_t @var{data}}, @
     @w{int @var{reserved}})
```

@since{1.8.0}

The function `@code{gpgme_op_keylist_from_data_start}` initiates a key listing operation inside the context `@var{ctx}`. In contrast to the other key listing operation the keys are read from the supplied `@var{data}` and not from the local key database. The keys are also not imported into the local key database. The function sets everything up so that subsequent invocations of `@code{gpgme_op_keylist_next}` return the keys from `@var{data}`.

The value of `@var{reserved}` must be `@code{0}`.

This function requires at least GnuPG version 2.1.14 and currently works only with OpenPGP keys.

The context will be busy until either all keys are received (and `@code{gpgme_op_keylist_next}` returns `@code{GPG_ERR_EOF}`), or `@code{gpgme_op_keylist_end}` is called to finish the operation.

While the context is busy `@var{data}` may not be released.

The function returns the error code `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

@end dectyfefun

```
@dectyfefun gpgme_error_t gpgme_op_keylist_next (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
```

```
*@var{r_key}))
```

The function `gpgme_op_keylist_next` returns the next key in the list created by a previous `gpgme_op_keylist_start` operation in the context `ctx`. The key will have one reference for the user. [Manipulating Keys](#).

This is the only way to get at `gpgme_key_t` objects in [GPGME](#).

If the last key in the list has already been returned, `gpgme_op_keylist_next` returns `GPG_ERR_EOF`.

The function returns the error code `GPG_ERR_INV_VALUE` if `ctx` or `r_key` is not a valid pointer, and `GPG_ERR_ENOMEM` if there is not enough memory for the operation.

```
@end deftypefun  
  
@deftypefun gpgme_error_t gpgme_op_keylist_end (@w{gpgme_ctx_t ctx})
```

The function `gpgme_op_keylist_end` ends a pending key list operation in the context `ctx`.

After the operation completed successfully, the result of the key listing operation can be retrieved with `gpgme_op_keylist_result`.

The function returns the error code `GPG_ERR_INV_VALUE` if `ctx` is not a valid pointer, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

The following example illustrates how all keys containing a certain string (`g10code`) can be listed with their key ID and the name and email address of the main user ID:

```
@example  
gpgme_ctx_t ctx;  
gpgme_key_t key;  
gpgme_error_t err = gpgme_new (&ctx);  
  
if (!err)  
  @ {  
    err = gpgme_op_keylist_start (ctx, "g10code", 0);  
    while (!err)  
      @ {  
        err = gpgme_op_keylist_next (ctx, &key);  
        if (err)
```

```

        break;
    printf ("%s:", key->subkeys->keyid);
    if (key->uids && key->uids->name)
        printf (" %s", key->uids->name);
    if (key->uids && key->uids->email)
        printf (" <%s>", key->uids->email);
    putchar ('\n');
    gpgme_key_release (key);
    @ }
gpgme_release (ctx);
@ }
if (gpg_err_code (err) != GPG_ERR_EOF)
@ {
    fprintf (stderr, "can not list keys: %s\n", gpgme_strerror (err));
    exit (1);
    @ }
@end example

```

`@def tp {Data type} {gpgme_keylist_result_t}`  
This is a pointer to a structure used to store the result of a  
`@code{gpgme_op_keylist_*}` operation. After successfully ending a key  
listing operation, you can retrieve the pointer to the result with  
`@code{gpgme_op_keylist_result}`. The structure contains the following  
member:

```

@table @code
@item unsigned int truncated : 1
This is true if the crypto backend had to truncate the result, and
less than the desired keys could be listed.
@end table
@end def tp

```

```

@def typefun gpgme_keylist_result_t gpgme_op_keylist_result (@w{gpgme_ctx_t @var{ctx}})
The function @code{gpgme_op_keylist_result} returns a  

@code{gpgme_keylist_result_t} pointer to a structure holding the  

result of a @code{gpgme_op_keylist_*} operation. The pointer is only  

valid if the last operation on the context was a key listing  

operation, and if this operation finished successfully. The returned  

pointer is only valid until the next operation is started on the  

context.
@end def typefun

```

In a simple program, for which a blocking operation is acceptable, the  
following function can be used to retrieve a single key.

```

@def typefun gpgme_error_t gpgme_get_key (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{fpr}},
@w{gpgme_key_t *@var{r_key}}, @w{int @var{secret}})
The function @code{gpgme_get_key} gets the key with the fingerprint

```

(or key ID) `@var{fpr}` from the crypto backend and return it in `@var{r_key}`. If `@var{secret}` is true, get the secret key. The currently active keylist mode is used to retrieve the key. The key will have one reference for the user.

If the key is not found in the keyring, `@code{gpgme_get_key}` returns the error code `@code{GPG_ERR_EOF}` and `*@var{r_key}` will be set to `@code{NULL}`.

The function returns the error code `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` or `@var{r_key}` is not a valid pointer or `@var{fpr}` is not a fingerprint or key ID, `@code{GPG_ERR_AMBIGUOUS_NAME}` if the key ID was not a unique specifier for a key, and `@code{GPG_ERR_ENOMEM}` if at some time during the operation there was not enough memory available.

`@end deftypefun`

`@node` Information About Keys

`@subsection` Information About Keys

`@cindex` key, information about

`@cindex` key, attributes

`@cindex` attributes, of a key

Please see the beginning of this section for more information about

`@code{gpgme_key_t}` objects.

`@deftp` {Data type} `gpgme_validity_t`

The `@code{gpgme_validity_t}` type is used to specify the validity of a user ID in a key. The following validities are defined:

`@table @code`

`@item` `GPGME_VALIDITY_UNKNOWN`

The user ID is of unknown validity. The string representation of this validity is ```?```.

`@item` `GPGME_VALIDITY_UNDEFINED`

The validity of the user ID is undefined. The string representation of this validity is ```q```.

`@item` `GPGME_VALIDITY_NEVER`

The user ID is never valid. The string representation of this validity is ```n```.

`@item` `GPGME_VALIDITY_MARGINAL`

The user ID is marginally valid. The string representation of this validity is ```m```.

`@item` `GPGME_VALIDITY_FULL`

The user ID is fully valid. The string representation of this validity is ``f`.

@item GPGME\_VALIDITY\_ULTIMATE

The user ID is ultimately valid. The string representation of this validity is ``u`.

@end table

@end deftp

@node Manipulating Keys

@subsection Manipulating Keys

@cindex key, manipulation

@deftypefun void gpgme\_key\_ref (@w{gpgme\_key\_t @var{key}})

The function @code{gpgme\_key\_ref} acquires an additional reference for the key @var{key}.

@end deftypefun

@deftypefun void gpgme\_key\_unref (@w{gpgme\_key\_t @var{key}})

The function @code{gpgme\_key\_unref} releases a reference for the key @var{key}. If this was the last reference, the key will be destroyed and all resources associated to it will be released.

@end deftypefun

@node Generating Keys

@subsection Generating Keys

@cindex key, creation

@cindex key ring, add

GPGME provides a set of functions to create public key pairs. Most of these functions require the use of GnuPG 2.1 and later; for older GnuPG versions the @code{gpgme\_op\_genkey} function can be used. Existing code which wants to update to the new functions or new code which shall supports older GnuPG versions may try the new functions first and provide a fallback to the old function if the error code @code{GPG\_ERR\_NOT\_SUPPORTED} is received.

@c

@c gpgme\_op\_createkey

@c

@deftypefun gpgme\_error\_t gpgme\_op\_createkey @

(@w{gpgme\_ctx\_t @var{ctx}}, @

@w{const char \*@var{userid}}, @

@w{const char \*@var{algo}}, @

```
@w{unsigned long @var{reserved}}, @  
@w{unsigned long @var{expires}}, @  
@w{gpgme_key_t @var{extrakey}}, @  
@w{unsigned int @var{flags}});
```

@since{1.7.0}

The function `gpgme_op_createkey` generates a new key for the protocol active in the context `ctx`. As of now this function does only work for OpenPGP and requires at least version 2.1.13 of GnuPG.

`userid` is commonly the mail address associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

`algo` specifies the algorithm for the new key (actually a keypair of public and private key). For a list of supported algorithms, see the GnuPG manual. If `algo` is `NULL` or the string "default", the key is generated using the default algorithm of the engine. If the string "future-default" is used the engine may use an algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms. For the OpenPGP protocol, the specification of a default algorithm, without requesting a non-default usage via `flags`, triggers the creation of a primary key plus a secondary key (subkey).

`reserved` must be set to zero.

`expires` specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag `GPGME_CREATE_NOEXPIRE` to create keys that do not expire. Note that this parameter takes an unsigned long value and not a `time_t` to avoid problems on systems which use a signed 32 bit `time_t`. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

`extrakey` is currently not used and must be set to `NULL`. A future version of GPGME may use this parameter to create X.509 keys.

`flags` can be set to the bit-wise OR of the following flags:

```
@table @code  
@item GPGME_CREATE_SIGN
```

@itemx GPGME\_CREATE\_ENCR  
@itemx GPGME\_CREATE\_CERT  
@itemx GPGME\_CREATE\_AUTH  
@since{1.7.0}

Do not create the key with the default capabilities (key usage) of the requested algorithm but use those explicitly given by these flags: ``signing``, ``encryption``, ``certification``, or ``authentication``. The allowed combinations depend on the algorithm.

If any of these flags are set and a default algorithm has been selected only one key is created in the case of the OpenPGP protocol.

@item GPGME\_CREATE\_NOPASSWD  
@since{1.7.0}

Request generation of the key without password protection.

@item GPGME\_CREATE\_SELFSIGNED  
@since{1.7.0}

For an X.509 key do not create a CSR but a self-signed certificate. This has not yet been implemented.

@item GPGME\_CREATE\_NOSTORE  
@since{1.7.0}

Do not store the created key in the local key database. This has not yet been implemented.

@item GPGME\_CREATE\_WANTPUB  
@itemx GPGME\_CREATE\_WANTSEC  
@since{1.7.0}

Return the public or secret key as part of the result structure. This has not yet been implemented.

@item GPGME\_CREATE\_FORCE  
@since{1.7.0}

The engine does not allow the creation of a key with a user ID already existing in the local key database. This flag can be used to override this check.

@item GPGME\_CREATE\_NOEXPIRE  
@since{1.8.0}

Request generation of keys that do not expire.

@end table

After the operation completed successfully, information about the created key can be retrieved with @code{gpgme\_op\_genkey\_result}.

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_createkey_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{const char *@var{userid}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{gpgme_key_t @var{extrakey}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createkey\_start} initiates a @code{gpgme\_op\_createkey} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end deftypefun

@c

@c gpgme\_op\_createsubkey

@c

```
@deftypefun gpgme_error_t gpgme_op_createsubkey @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createsubkey} creates and adds a new subkey to the primary OpenPGP key given by @var{KEY}. The only allowed protocol in @var{ctx} is @code{GPGME\_PROTOCOL\_OPENPGP}.

Subkeys (aka secondary keys) are a concept in the OpenPGP protocol to bind several keys to a primary key. As of now this function requires at least version 2.1.13 of GnuPG.

`@var{key}` specifies the key to operate on.

`@var{algo}` specifies the algorithm for the new subkey. For a list of supported algorithms, see the GnuPG manual. If `@var{algo}` is `@code{NULL}` or the string "default", the subkey is generated using the default algorithm for an encryption subkey of the engine. If the string "future-default" is used the engine may use an encryption algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms.

`@var{reserved}` must be set to zero.

`@var{expires}` specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag `@code{GPGME_CREATE_NOEXPIRE}` to create keys that do not expire. Note that this parameter takes an unsigned long value and not a `@code{time_t}` to avoid problems on systems which use a signed 32 bit `@code{time_t}`. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

`@var{flags}` takes the same values as described above for `@code{gpgme_op_createkey}`.

After the operation completed successfully, information about the created key can be retrieved with `@code{gpgme_op_genkey_result}`.

The function returns zero on success, `@code{GPG_ERR_NOT_SUPPORTED}` if the engine does not support the command, or a bunch of other error codes.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_createsubkey_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

`@since{1.7.0}`

The function `gpgme_op_createsubkey_start` initiates a `gpgme_op_createsubkey` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

```
@end deftypefun
```

```
@c
```

```
@c gpgme_op_adduid
```

```
@c
```

```
@deftypefun gpgme_error_t gpgme_op_adduid @
```

```
  (@w{gpgme_ctx_t @var{ctx}}, @
```

```
   @w{gpgme_key_t @var{key}}, @
```

```
   @w{const char *@var{userid}}, @
```

```
   @w{unsigned int @var{flags}});
```

```
@since{1.7.0}
```

The function `gpgme_op_adduid` adds a new user ID to the OpenPGP key given by `KEY`. Adding additional user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `ctx` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`key` specifies the key to operate on.

`userid` is the user ID to add to the key. A user ID is commonly the mail address to be associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

`flags` are currently not used and must be set to zero.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_adduid_start @
```

```
  (@w{gpgme_ctx_t @var{ctx}}, @
```

```
   @w{gpgme_key_t @var{key}}, @
```

```
   @w{const char *@var{userid}}, @
```

```
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function `gpgme_op_adduid_start` initiates a `gpgme_op_adduid` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

@end deftypefun

@c

@c gpgme\_op\_revuid

@c

```
@deftypefun gpgme_error_t gpgme_op_revuid @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function `gpgme_op_revuid` revokes a user ID from the OpenPGP key given by `KEY`. Revoking user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `ctx` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`key` specifies the key to operate on.

`userid` is the user ID to be revoked from the key. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `uid` field from the user ID object (`gpgme_user_id_t`) is to be used. This is a required parameter.

`flags` are currently not used and must be set to zero.

Note that the engine won't allow to revoke the last valid user ID. To change a user ID is better to first add the new user ID, then revoke the old one, and finally publish the key.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_revuid_start @
```

```
(@w{gpgme_ctx_t @var{ctx}}, @  
@w{gpgme_key_t @var{key}}, @  
@w{const char *@var{userid}}, @  
@w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_revuid\_start} initiates a @code{gpgme\_op\_revuid} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end deffun

@c

@c gpgme\_op\_set\_uid\_flag

@c

```
@deffun gpgme_error_t gpgme_op_set_ui_flag @  
(@w{gpgme_ctx_t @var{ctx}}, @  
@w{gpgme_key_t @var{key}}, @  
@w{const char *@var{userid}}, @  
@w{const char * @var{name}}, @  
@w{const char * @var{value}});
```

@since{1.8.0}

The function @code{gpgme\_op\_set\_uid\_flag} is used to set flags on a user ID from the OpenPGP key given by @var{KEY}. Setting flags on user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context @var{ctx} must be set to OpenPGP.

@var{key} specifies the key to operate on. This parameter is required.

@var{userid} is the user ID of the key to be manipulated. This user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the @code{uid} field from the user ID object (@code{gpgme\_user\_id\_t}) is to be used. This is a required parameter.

@var{name} names the flag which is to be changed. The only currently supported flag is:

@table @code

@item primary

This sets the primary key flag on the given user ID. All other primary key flags on other user IDs are removed. @var{value} must be given as NULL. For technical reasons this function bumps the creation timestamp of all affected self-signatures up by one second.

At least GnuPG version 2.1.20 is required.

@end table

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deffun

```
@deffun gpgme_error_t gpgme_op_set_uid_flag_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{const char * @var{name}}, @
   @w{const char * @var{value}});
```

@since{1.8.0}

The function @code{gpgme\_op\_set\_uid\_flag\_start} initiates a @code{gpgme\_op\_set\_uid\_flag} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end deffun

@c

@c gpgme\_op\_genkey

@c

```
@deffun gpgme_error_t gpgme_op_genkey @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{const char *@var{parms}}, @
   @w{gpgme_data_t @var{public}}, @
   @w{gpgme_data_t @var{secret}})
```

The function @code{gpgme\_op\_genkey} generates a new key pair in the context @var{ctx}. The meaning of @var{public} and @var{secret} depends on the crypto backend.

GPG does not support @var{public} and @var{secret}, they should be @code{NULL}. GnuPG will generate a key pair and add it to the standard key ring. The fingerprint of the generated key is available with @code{gpgme\_op\_genkey\_result}.

GpgSM requires @var{public} to be a writable data object. GpgSM will generate a secret key (which will be stored by @command{gpg-agent}), and return a certificate request in @var{public}, which then needs to be signed by the certification authority and imported before it can be

used. GpgSM does not make the fingerprint available.

The argument `@var{parms}` specifies parameters for the key in an string that looks something like XML. The details about the format of `@var{parms}` are specific to the crypto engine used by `@var{ctx}`. The first line of the parameters must be `@code{<GnupgKeyParams format="internal">}` and the last line must be `@code{</GnupgKeyParams>}`. Every line in between the first and last lines is treated as a Header: Value pair. In particular, no XML escaping is necessary if you need to include the characters `@code{<}`, `@code{>}`, or `@code{&}`.

Here is an example for GnuPG as the crypto engine (all parameters of OpenPGP key generation are documented in the GPG manual):

```
@example
<GnupgKeyParams format="internal">
Key-Type: default
Subkey-Type: default
Name-Real: Joe Tester
Name-Comment: with stupid passphrase
Name-Email: joe@@foo.bar
Expire-Date: 0
Passphrase: abc
</GnupgKeyParams>
@end example
```

Here is an example for GpgSM as the crypto engine (all parameters of OpenPGP key generation are documented in the GPGSM manual):

```
@example
<GnupgKeyParams format="internal">
Key-Type: RSA
Key-Length: 1024
Name-DN: C=de,O=g10 code,OU=Testlab,CN=Joe 2 Tester
Name-Email: joe@@foo.bar
</GnupgKeyParams>
@end example
```

Strings should be given in UTF-8 encoding. The only format supported for now is `internal`. The content of the `@code{GnupgKeyParams}` container is passed verbatim to the crypto backend. Control statements are not allowed.

After the operation completed successfully, the result can be retrieved with `@code{gpgme_op_genkey_result}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the

operation could be started successfully, `GPG_ERR_INV_VALUE` if `parms` is not a well-formed string (e.g. does not have the expected tag-like headers and footers), `GPG_ERR_NOT_SUPPORTED` if `public` or `secret` is not valid, and `GPG_ERR_GENERAL` if no key was created by the backend.

```
@deftypefun gpgme_error_t gpgme_op_genkey_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{parms}}, @w{gpgme_data_t @var{public}}, @w{gpgme_data_t @var{secret}})
```

The function `gpgme_op_genkey_start` initiates a `gpgme_op_genkey` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `parms` is not a valid XML string, and `GPG_ERR_NOT_SUPPORTED` if `public` or `secret` is not `NULL`.

```
@c
@c gpgme_op_genkey_result
@c
@deftp {Data type} {gpgme_genkey_result_t}
```

This is a pointer to a structure used to store the result of a `gpgme_op_genkey` operation. After successfully generating a key, you can retrieve the pointer to the result with `gpgme_op_genkey_result`. The structure contains the following members:

```
@table @code
@item unsigned int primary : 1
This flag is set to 1 if a primary key was created and to 0 if not.
```

```
@item unsigned int sub : 1
This flag is set to 1 if a subkey was created and to 0 if not.
```

```
@item unsigned int uid : 1
This flag is set to 1 if a user ID was created and to 0 if not.
```

```
@item char *fpr
This is the fingerprint of the key that was created. If both a primary and a subkey were generated, the fingerprint of the primary key will be returned. If the crypto engine does not provide the
```

fingerprint, `@code{fpr}` will be a null pointer.

```
@item gpgme_data_t pubkey
@since{1.7.0}
```

This will eventually be used to return the public key. It is currently not used.

```
@item gpgme_data_t seckey
@since{1.7.0}
```

This will eventually be used to return the secret key. It is currently not used.

```
@end table
@end deftp
```

```
@deftypefun gpgme_genkey_result_t gpgme_op_genkey_result (@w{gpgme_ctx_t @var{ctx}})
```

The function `@code{gpgme_op_genkey_result}` returns a `@code{gpgme_genkey_result_t}` pointer to a structure holding the result of a `@code{gpgme_op_genkey}` operation. The pointer is only valid if the last operation on the context was a `@code{gpgme_op_genkey}` or `@code{gpgme_op_genkey_start}` operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

```
@end deftypefun
```

```
@c
@c SIGNING KEYS
@c
@node Signing Keys
@subsection Signing Keys
@cindex key, signing
```

Key signatures are a unique concept of the OpenPGP protocol. They can be used to certify the validity of a key and are used to create the Web-of-Trust (WoT). Instead of using the `@code{gpgme_op_interact}` function along with a finite state machine, GPGME provides a convenient function to create key signatures when using modern GnuPG versions.

```
@c
@c gpgme_op_keysign
@c
```

```
@deftypefun gpgme_error_t gpgme_op_keysign @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_keysign} adds a new key signature to the public key @var{KEY}. This function requires at least version 2.1.12 of GnuPG.

@var{CTX} is the usual context which describes the protocol to use (which must be OpenPGP) and has also the list of signer keys to be used for the signature. The common case is to use the default key for signing other keys. If another key or more than one key shall be used for a key signature, @code{gpgme\_signers\_add} can be used. @xref{Selecting Signers}.

@var{key} specifies the key to operate on.

@var{userid} selects the user ID or user IDs to be signed. If @var{userid} is set to @code{NULL} all valid user IDs are signed. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the @code{uid} field from the user ID object (@code{gpgme\_user\_id\_t}) is to be used. To select more than one user ID put them all into one string separated by linefeeds characters (@code{\n}) and set the flag @code{GPGME\_KEYSIGN\_LFSEP}.

@var{expires} specifies the expiration time of the new signature in seconds. The common case is to use 0 to not set an expiration date. However, if the configuration of the engine defines a default expiration for key signatures, that is still used unless the flag @code{GPGME\_KEYSIGN\_NOEXPIRE} is used. Note that this parameter takes an unsigned long value and not a @code{time\_t} to avoid problems on systems which use a signed 32 bit @code{time\_t}. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

@var{flags} can be set to the bit-wise OR of the following flags:

```
@table @code
@item GPGME_KEYSIGN_LOCAL
@since{1.7.0}
```

Instead of creating an exportable key signature, create a key signature which is marked as non-exportable.

@item GPGME\_KEYSIGN\_LFSEP

@since{1.7.0}

Although linefeeds are uncommon in user IDs this flag is required to explicitly declare that @var{userid} may contain several linefeed separated user IDs.

@item GPGME\_KEYSIGN\_NOEXPIRE

Force the creation of a key signature without an expiration date. This overrides @var{expire} and any local configuration of the engine.

@end table

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end dectypedefun

@dectypedefun gpgme\_error\_t gpgme\_op\_keysign\_start @

```
(@w{gpgme_ctx_t @var{ctx}}, @  
  @w{gpgme_key_t @var{key}}, @  
  @w{const char *@var{userid}}, @  
  @w{unsigned long @var{expires}}, @  
  @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_keysign\_start} initiates a @code{gpgme\_op\_keysign} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end dectypedefun

@c

@c EXPORTING KEYS

@c

@node Exporting Keys

@subsection Exporting Keys

@cindex key, export

@cindex key ring, export from

Exporting keys means the same as running @command{gpg} with the command @option{--export}. However, a mode flag can be used to change the way

the export works. The available mode flags are described below, they may be or-ed together.

@table @code

@item GPGME\_EXPORT\_MODE\_EXTERN

If this bit is set, the output is send directly to the default keyserver. This is currently only allowed for OpenPGP keys. It is good practise to not send more than a few dozens key to a keyserver at one time. Using this flag requires that the @var{keydata} argument of the export function is set to @code{NULL}.

@item GPGME\_EXPORT\_MODE\_MINIMAL

@since{1.3.1}

If this bit is set, the smallest possible key is exported. For OpenPGP keys it removes all signatures except for the latest self-signatures. For X.509 keys it has no effect.

@item GPGME\_EXPORT\_MODE\_SECRET

@since{1.6.0}

Instead of exporting the public key, the secret key is exported. This may not be combined with @code{GPGME\_EXPORT\_MODE\_EXTERN}. For X.509 the export format is PKCS#8.

@item GPGME\_EXPORT\_MODE\_RAW

@since{1.6.0}

If this flag is used with @code{GPGME\_EXPORT\_MODE\_SECRET} for an X.509 key the export format will be changed to PKCS#1. This flag may not be used with OpenPGP.

@item GPGME\_EXPORT\_MODE\_PKCS12

@since{1.6.0}

If this flag is used with @code{GPGME\_EXPORT\_MODE\_SECRET} for an X.509 key the export format will be changed to PKCS#12 which also includes the certificate. This flag may not be used with OpenPGP.

@item GPGME\_EXPORT\_MODE\_NOUID

@since{1.12.0 - experimental}

Do not export user ids. Works only with certain gpg version.

@end table

```
@deftypefun gpgme_error_t gpgme_op_export (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{pattern}},  
@w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
```

The function `gpgme_op_export` extracts public keys and returns them in the data buffer `@var{keydata}`. The output format of the key data returned is determined by the `ASCII` armor attribute set for the context `@var{ctx}`, or, if that is not set, by the encoding specified for `@var{keydata}`.

If `@var{pattern}` is `NULL`, all available keys are returned. Otherwise, `@var{pattern}` contains an engine specific expression that is used to limit the list to all keys matching the pattern.

`@var{mode}` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation completed successfully, `GPG_ERR_INV_VALUE` if `@var{keydata}` is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_export_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char  
*@var{pattern}}, @w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
```

The function `gpgme_op_export_start` initiates a `gpgme_op_export` operation. It can be completed by calling `gpgme_wait` on the context. `Waiting For Completion`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `@var{keydata}` is not a valid empty data buffer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_export_ext (@w{gpgme_ctx_t @var{ctx}}, @w{const char  
*@var{pattern}}[], @w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
```

The function `gpgme_op_export_ext` extracts public keys and returns them in the data buffer `@var{keydata}`. The output format of the key data returned is determined by the `ASCII` armor attribute set for the context `@var{ctx}`, or, if that is not set, by the encoding specified for `@var{keydata}`.

If `@var{pattern}` or `@var{*pattern}` is `NULL`, all available keys are returned. Otherwise, `@var{pattern}` is a `NULL` terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim.

`@var{mode}` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the

operation completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.  
@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_export_ext_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{pattern}[]}, @w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
The function @code{gpgme_op_export_ext_start} initiates a
@code{gpgme_op_export_ext} operation. It can be completed by calling
@code{gpgme_wait} on the context. @xref{Waiting For Completion}.
```

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation could be started successfully, and @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer.  
@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_export_keys (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t keys[]},
@w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
@since{1.2.0}
```

The function @code{gpgme\_op\_export\_keys} extracts public keys and returns them in the data buffer @var{keydata}. The output format of the key data returned is determined by the @acronym{ASCII} armor attribute set for the context @var{ctx}, or, if that is not set, by the encoding specified for @var{keydata}.

The keys to export are taken from the @code{NULL} terminated array @var{keys}. Only keys of the currently selected protocol of @var{ctx} which do have a fingerprint set are considered for export. Other keys specified by the @var{keys} are ignored. In particular OpenPGP keys retrieved via an external key listing are not included.

@var{mode} is usually 0; other values are described above.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer, @code{GPG\_ERR\_NO\_DATA} if no useful keys are in @var{keys} and passes through any errors that are reported by the crypto engine support routines.  
@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_export_keys_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{keys}[]}, @w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
@since{1.2.0}
```

The function @code{gpgme\_op\_export\_keys\_start} initiates a @code{gpgme\_op\_export\_ext} operation. It can be completed by calling

`gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `keydata` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `keys` and passes through any errors that are reported by the crypto engine support routines.

`gpgme_wait`

## Importing Keys

### Importing Keys

key, import

key ring, import to

Importing keys means the same as running `gpg` with the command `--import`.

```
gpgme_error_t gpgme_op_import (gpgme_ctx_t ctx, gpgme_data_t keydata)
```

The function `gpgme_op_import` adds the keys in the data buffer `keydata` to the key ring of the crypto engine used by `ctx`.

The format of `keydata` can be `ASCII armored`, for example, but the details are specific to the crypto engine.

After the operation completed successfully, the result can be retrieved with `gpgme_op_import_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `keydata` if `ctx` or `keydata` is not a valid pointer, and `GPG_ERR_NO_DATA` if `keydata` is an empty data buffer.

`gpgme_op_import`

```
gpgme_error_t gpgme_op_import_start (gpgme_ctx_t ctx, gpgme_data_t keydata)
```

The function `gpgme_op_import_start` initiates a `gpgme_op_import` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the import could be started successfully, `GPG_ERR_INV_VALUE` if `ctx` or `keydata` is not a valid pointer, and `GPG_ERR_NO_DATA` if `keydata` is an empty data buffer.

`gpgme_op_import_start`

```
gpgme_error_t gpgme_op_import_keys (gpgme_ctx_t ctx, gpgme_key_t keys)
```

```
*@var{keys}))  
@since{1.2.0}
```

The function `gpgme_op_import_keys` adds the keys described by the `NULL` terminated array `keys` to the key ring of the crypto engine used by `ctx`. It is used to actually import and make keys permanent which have been retrieved from an external source (i.e. using `GPGME_KEYLIST_MODE_EXTERN`) earlier. The external keylisting must have been made with the same context configuration (in particular the same home directory). Thus it is a replacement for the usual workaround of exporting and then importing a key to make an X.509 key permanent. Note that for OpenPGP this may require another access to the keyserver over the network.

Only keys of the currently selected protocol of `ctx` are considered for import. Other keys specified by the `keys` are ignored. As of now all considered keys must have been retrieved using the same method, i.e. the used key listing mode must be identical.

After the operation completed successfully, the result can be retrieved with `gpgme_op_import_result`.

To move keys from one home directory to another, export and import the keydata using `gpgme_op_export` and `gpgme_op_import`.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `ctx` is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_import_keys_start (@w{gpgme_ctx_t} ctx, @w{gpgme_key_t}  
*@var{keys}))  
@since{1.2.0}
```

The function `gpgme_op_import_keys_start` initiates a `gpgme_op_import_keys` operation. It can be completed by calling `gpgme_wait` on the context. Waiting For Completion.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `keydata` if `ctx` or `keydata` is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

```
@end deftypefun
```

```
@deftp {Data type} {gpgme_import_status_t}
```

This is a pointer to a structure used to store a part of the result of a `{gpgme_op_import}` operation. For each considered key one status is added that contains information about the result of the import. The structure contains the following members:

`@table @code`

`@item gpgme_import_status_t next`

This is a pointer to the next status structure in the linked list, or `{NULL}` if this is the last element.

`@item char *fpr`

This is the fingerprint of the key that was considered.

`@item gpgme_error_t result`

If the import was not successful, this is the error value that caused the import to fail. Otherwise the error code is

`{GPG_ERR_NO_ERROR}`.

`@item unsigned int status`

This is a bit-wise OR of the following flags that give more information about what part of the key was imported. If the key was already known, this might be 0.

`@table @code`

`@item GPGME_IMPORT_NEW`

The key was new.

`@item GPGME_IMPORT_UID`

The key contained new user IDs.

`@item GPGME_IMPORT_SIG`

The key contained new signatures.

`@item GPGME_IMPORT_SUBKEY`

The key contained new sub keys.

`@item GPGME_IMPORT_SECRET`

The key contained a secret key.

`@end table`

`@end table`

`@end deftp`

`@deftp {Data type} {gpgme_import_result_t}`

This is a pointer to a structure used to store the result of a `{gpgme_op_import}` operation. After a successful import operation, you can retrieve the pointer to the result with `{gpgme_op_import_result}`. The structure contains the following members:

@table @code

@item int considered

The total number of considered keys.

@item int no\_user\_id

The number of keys without user ID.

@item int imported

The total number of imported keys.

@item int imported\_rsa

The number of imported RSA keys.

@item int unchanged

The number of unchanged keys.

@item int new\_user\_ids

The number of new user IDs.

@item int new\_sub\_keys

The number of new sub keys.

@item int new\_signatures

The number of new signatures.

@item int new\_revocations

The number of new revocations.

@item int secret\_read

The total number of secret keys read.

@item int secret\_imported

The number of imported secret keys.

@item int secret\_unchanged

The number of unchanged secret keys.

@item int not\_imported

The number of keys not imported.

@item gpgme\_import\_status\_t imports

A list of gpgme\_import\_status\_t objects which contain more information about the keys for which an import was attempted.

@item int skipped\_v3\_keys

For security reasons modern versions of GnuPG do not anymore support v3 keys (created with PGP 2.x) and ignores them on import. This

counter provides the number of such skipped v3 keys.

@end table

@end deftp

@deftypefun gpgme\_import\_result\_t gpgme\_op\_import\_result (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_op\_import\_result} returns a

@code{gpgme\_import\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_import} operation. The pointer is only valid if the last operation on the context was a @code{gpgme\_op\_import} or @code{gpgme\_op\_import\_start} operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

@end deftypefun

@node Deleting Keys

@subsection Deleting Keys

@cindex key, delete

@cindex key ring, delete from

@deftypefun gpgme\_error\_t gpgme\_op\_delete\_ext (@w{gpgme\_ctx\_t @var{ctx}}, @w{const gpgme\_key\_t @var{key}}, @w{unsigned int @var{flags}})

@since{1.9.1}

The function @code{gpgme\_op\_delete\_ext} deletes the key @var{key} from the key ring of the crypto engine used by @var{ctx}.

@var{flags} can be set to the bit-wise OR of the following flags:

@table @code

@item GPGME\_DELETE\_ALLOW\_SECRET

@since{1.9.1}

If not set, only public keys are deleted. If set, secret keys are deleted as well, if that is supported.

@item GPGME\_DELETE\_FORCE

@since{1.9.1}

If set, the user is not asked to confirm the deletion.

@end table

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the key was deleted successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{key} is not a valid pointer, @code{GPG\_ERR\_NO\_PUBKEY} if @var{key} could not be found in the keyring, @code{GPG\_ERR\_AMBIGUOUS\_NAME} if the key was not specified unambiguously, and @code{GPG\_ERR\_CONFLICT} if the secret key for

@var{key} is available, but @var{allow\_secret} is zero.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_delete_ext_start (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t
@var{key}}, @w{unsigned int @var{flags}})
@since{1.9.1}
```

The function @code{gpgme\_op\_delete\_ext\_start} initiates a  
@code{gpgme\_op\_delete} operation. It can be completed by calling  
@code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the  
operation was started successfully, and @code{GPG\_ERR\_INV\_VALUE} if  
@var{ctx} or @var{key} is not a valid pointer.

@end deftypefun

The following functions allow only to use one particular flag.

```
@deftypefun gpgme_error_t gpgme_op_delete (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t
@var{key}}, @w{int @var{allow_secret}})
```

Similar to @code{gpgme\_op\_delete\_ext}, but only the flag  
@code{GPGME\_DELETE\_ALLOW\_SECRET} can be provided.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_delete_start (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t
@var{key}}, @w{int @var{allow_secret}})
```

Similar to @code{gpgme\_op\_delete\_ext\_start}, but only the flag  
@code{GPGME\_DELETE\_ALLOW\_SECRET} can be provided.

@end deftypefun

@node Changing Passphrases

@subsection Changing Passphrases

@cindex passphrase, change

```
@deftypefun gpgme_error_t gpgme_op_passwd @
(@w{gpgme_ctx_t @var{ctx}}, @
@w{const gpgme_key_t @var{key}}, @
@w{unsigned int @var{flags}})
```

@since{1.3.0}

The function @code{gpgme\_op\_passwd} changes the passphrase of the  
private key associated with @var{key}. The only allowed value for  
@var{flags} is @code{0}. The backend engine will usually popup a window  
to ask for the old and the new passphrase. Thus this function is not  
useful in a server application (where passphrases are not required  
anyway).

Note that old `{gpg}` engines (before version 2.0.15) do not support this command and will silently ignore it.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_passwd_start    @
    (@w{gpgme_ctx_t @var{ctx}},    @
     @w{const gpgme_key_t @var{key}}, @
     @w{unsigned int @var{flags}})
```

`@since{1.3.0}`

The function `{gpgme_op_passwd_start}` initiates a `{gpgme_op_passwd}` operation. It can be completed by calling `{gpgme_wait}` on the context. [@xref{Waiting For Completion}](#).

The function returns `{0}` if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

`@end deftypefun`

`@c`

`@c CHANGING TOFU DATA`

`@c`

`@node Changing TOFU Data`

`@subsection Changing TOFU Data`

`@cindex validity, TOFU`

The OpenPGP engine features a Trust-On-First-Use (TOFU) key validation model. For resolving conflicts it is necessary to declare the policy for a key. See the GnuPG manual for details on the TOFU implementation.

```
@deftp {Data type} {enum gpgme_tofu_policy_t}
```

`@since{1.7.0}`

```
@tindex gpgme_tofu_policy_t
```

The `{gpgme_tofu_policy_t}` type specifies the set of possible policy values that are supported by [@acronym{GPGME}](#):

```
@table @code
```

```
@item GPGME_TOFU_POLICY_AUTO
```

Set the policy to ```auto```.

```
@item GPGME_TOFU_POLICY_GOOD
```

Set the policy to ```good```.

```
@item GPGME_TOFU_POLICY_BAD
```

Set the policy to ```bad```.

```
@item GPGME_TOFU_POLICY_ASK
Set the policy to ``ask".
@item GPGME_TOFU_POLICY_UNKNOWN
Set the policy to ``unknown".
@end table
```

```
@end deftp
```

To change the policy for a key the following functions can be used:

```
@deftypefun gpgme_error_t gpgme_op_tofu_policy @
  (@w{gpgme_ctx_t @var{ctx}}, @
  @w{const gpgme_key_t @var{key}}, @
  @w{gpgme_tofu_policy_t @var{policy}})
```

```
@since{1.7.0}
```

The function `gpgme_op_tofu_policy` changes the TOFU policy of `@var{key}`. The valid values for `@var{policy}` are listed above. As of now this function does only work for OpenPGP and requires at least version 2.1.10 of GnuPG.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_tofu_policy_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
  @w{const gpgme_key_t @var{key}}, @
  @w{gpgme_tofu_policy_t @var{policy}})
```

```
@since{1.7.0}
```

The function `gpgme_op_tofu_policy_start` initiates a `gpgme_op_tofu_policy` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns `0` if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

```
@end deftypefun
```

```
@node Advanced Key Editing
```

```
@subsection Advanced Key Editing
```

@cindex key, edit

```
@deftp {Data type} {gpgme_error_t (*gpgme_interact_cb_t) @  
  (@w{void *@var{handle}}, @  
  @w{const char *@var{status}}, @  
  @w{const char *@var{args}}, @  
  @w{int @var{fd}})}
```

@since{1.7.0}

@tindex gpgme\_interact\_cb\_t

The @code{gpgme\_interact\_cb\_t} type is the type of functions which @acronym{GPGME} calls if a key interact operation is on-going. The status keyword @var{status} and the argument line @var{args} are passed through by @acronym{GPGME} from the crypto engine. An empty string represents EOF. The file descriptor @var{fd} is -1 for normal status messages. If @var{status} indicates a command rather than a status message, the response to the command should be written to @var{fd}. The @var{handle} is provided by the user at start of operation.

The function should return @code{GPG\_ERR\_FALSE} if it did not handle the status code, @code{0} for success, or any other error value.

@end deftp

```
@deftypefun gpgme_error_t gpgme_op_interact (@w{gpgme_ctx_t @var{ctx}}, @  
  @w{gpgme_key_t @var{key}}, @  
  @w{unsigned int @var{flags}}, @  
  @w{gpgme_interact_cb_t @var{fnc}}, @  
  @w{void *@var{handle}}, @  
  @w{gpgme_data_t @var{out}})
```

@since{1.7.0}

The function @code{gpgme\_op\_interact} processes the key @var{KEY} interactively, using the interact callback function @var{FNC} with the handle @var{HANDLE}. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object @var{out}.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by @acronym{GPGME}.

@var{flags} modifies the behaviour of the function; the only defined bit value is:

@table @code

@item GPGME\_INTERACT\_CARD

@since{1.7.0}

This is used for smartcard based keys and uses gpgs

@code{--card-edit} command.

@end table

The function returns @code{0} if the edit operation completes successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{key} is not a valid pointer, and any error returned by the crypto engine or the edit callback handler.

@end deffun

```
@deffun gpgme_error_t gpgme_op_interact_start (@w{gpgme_ctx_t @var{ctx}}, @
  @w{gpgme_key_t @var{key}}, @
  @w{unsigned int @var{flags}}, @
  @w{gpgme_interact_cb_t @var{fnc}}, @
  @w{void *@var{handle}}, @
  @w{gpgme_data_t @var{out}})
```

@since{1.7.0}

The function @code{gpgme\_op\_interact\_start} initiates a @code{gpgme\_op\_interact} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns @code{0} if the operation was started successfully, and @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{key} is not a valid pointer.

@end deffun

@node Trust Item Management

@section Trust Item Management

@cindex trust item

@strong{Caution:} The trust items interface is experimental.

@deftp {Data type} gpgme\_trust\_item\_t

The @code{gpgme\_trust\_item\_t} type is a pointer to a trust item object.

It has the following members:

@table @code

@item char \*keyid

This is a string describing the key to which this trust items belongs.

@item int type

This is the type of the trust item. A value of 1 refers to a key, a value of 2 refers to a user ID.

@item int level

This is the trust level.

@item char \*owner\_trust

The owner trust if @code{type} is 1.

@item char \*validity

The calculated validity.

@item char \*name

The user name if @code{type} is 2.

@end table

@end deftp

@menu

\* Listing Trust Items::        Browsing the list of available trust items.

\* Manipulating Trust Items::    Operations on trust items.

@end menu

@node Listing Trust Items

@subsection Listing Trust Items

@cindex trust item list

@deftypefun gpgme\_error\_t gpgme\_op\_trustlist\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{pattern}}, @w{int @var{max\_level}})

The function @code{gpgme\_op\_trustlist\_start} initiates a trust item listing operation inside the context @var{ctx}. It sets everything up so that subsequent invocations of @code{gpgme\_op\_trustlist\_next} return the trust items in the list.

The string @var{pattern} contains an engine specific expression that is used to limit the list to all trust items matching the pattern. It can not be the empty string.

The argument @var{max\_level} is currently ignored.

The context will be busy until either all trust items are received (and @code{gpgme\_op\_trustlist\_next} returns @code{GPG\_ERR\_EOF}), or @code{gpgme\_op\_trustlist\_end} is called to finish the operation.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, and passes through any errors that

are reported by the crypto engine support routines.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_trustlist_next (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_trust_item_t
*@var{r_item}})
```

The function @code{gpgme\_op\_trustlist\_next} returns the next trust item in the list created by a previous @code{gpgme\_op\_trustlist\_start} operation in the context @var{ctx}. The trust item can be destroyed with @code{gpgme\_trust\_item\_release}. @xref{Manipulating Trust Items}.

This is the only way to get at @code{gpgme\_trust\_item\_t} objects in @acronym{GPGME}.

If the last trust item in the list has already been returned,

@code{gpgme\_op\_trustlist\_next} returns @code{GPG\_ERR\_EOF}.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{r\_item} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if there is not enough memory for the operation.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_trustlist_end (@w{gpgme_ctx_t @var{ctx}})
```

The function @code{gpgme\_op\_trustlist\_end} ends a pending trust list operation in the context @var{ctx}.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if at some time during the operation there was not enough memory available.

@end deftypefun

@node Manipulating Trust Items

@subsection Manipulating Trust Items

@cindex trust item, manipulation

```
@deftypefun void gpgme_trust_item_ref (@w{gpgme_trust_item_t @var{item}})
```

The function @code{gpgme\_trust\_item\_ref} acquires an additional reference for the trust item @var{item}.

@end deftypefun

```
@deftypefun void gpgme_trust_item_unref (@w{gpgme_trust_item_t @var{item}})
```

The function @code{gpgme\_trust\_item\_unref} releases a reference for the trust item @var{item}. If this was the last reference, the trust item will be destroyed and all resources associated to it will be released.

@end deftypefun

@node Crypto Operations  
@section Crypto Operations  
@cindex cryptographic operation

Sometimes, the result of a crypto operation returns a list of invalid keys encountered in processing the request. The following structure is used to hold information about such a key.

@deftp {Data type} {gpgme\_invalid\_key\_t}  
This is a pointer to a structure used to store a part of the result of a crypto operation which takes user IDs as one input parameter. The structure contains the following members:

@table @code  
@item gpgme\_invalid\_key\_t next  
This is a pointer to the next invalid key structure in the linked list, or @code{NULL} if this is the last element.

@item char \*fpr  
The fingerprint or key ID of the invalid key encountered.

@item gpgme\_error\_t reason  
An error code describing the reason why the key was found invalid.

@end table  
@end deftp

@menu  
\* Decrypt::                Decrypting a ciphertext.  
\* Verify::                Verifying a signature.  
\* Decrypt and Verify::    Decrypting a signed ciphertext.  
\* Sign::                 Creating a signature.  
\* Encrypt::               Encrypting a plaintext.  
@end menu

@node Decrypt  
@subsection Decrypt  
@cindex decryption  
@cindex cryptographic operation, decryption

@deftypedefun gpgme\_error\_t gpgme\_op\_decrypt (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{cipher}}, @w{gpgme\_data\_t @var{plain}})  
The function @code{gpgme\_op\_decrypt} decrypts the ciphertext in the data object @var{cipher} and stores it into the data object @var{plain}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the

ciphertext could be decrypted successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx}, @var{cipher} or @var{plain} is not a valid pointer, @code{GPG\_ERR\_NO\_DATA} if @var{cipher} does not contain any data to decrypt, @code{GPG\_ERR\_DECRYPT\_FAILED} if @var{cipher} is not a valid cipher text, @code{GPG\_ERR\_BAD\_PASSPHRASE} if the passphrase for the secret key could not be retrieved, and passes through some errors that are reported by the crypto engine support routines.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_decrypt_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{cipher}}, @w{gpgme_data_t @var{plain}})
```

The function @code{gpgme\_op\_decrypt\_start} initiates a @code{gpgme\_op\_decrypt} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation could be started successfully, and @code{GPG\_ERR\_INV\_VALUE} if @var{cipher} or @var{plain} is not a valid pointer.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_decrypt_ext ( @w{gpgme_ctx_t @var{ctx}}, @w{gpgme_decrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{cipher}}, @w{gpgme_data_t @var{plain}})
```

@since{1.8.0}

The function @code{gpgme\_op\_decrypt\_ext} is the same as @code{gpgme\_op\_decrypt} but has an additional argument @var{flags}. If @var{flags} is 0 both function behave identically.

The value in @var{flags} is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_DECRYPT_VERIFY
@since{1.8.0}
```

The @code{GPGME\_DECRYPT\_VERIFY} symbol specifies that this function shall exactly act as @code{gpgme\_op\_decrypt\_verify}.

```
@item GPGME_DECRYPT_UNWRAP
@since{1.8.0}
```

The @code{GPGME\_DECRYPT\_UNWRAP} symbol specifies that the output shall be an OpenPGP message with only the encryption layer removed. This

requires GnuPG 2.1.12 and works only for OpenPGP. This is the counterpart to `GPGME_ENCRYPT_WRAP`.

@end table

The function returns the error codes as described for `gpgme_op_decrypt` respective `gpgme_op_encrypt`.  
@end dectyfefun

```
@dectyfefun gpgme_error_t gpgme_op_decrypt_ext_start ( @
    @w{gpgme_ctx_t @var{ctx}}, @
    @w{gpgme_decrypt_flags_t @var{flags}}, @
    @w{gpgme_data_t @var{cipher}}, @
    @w{gpgme_data_t @var{plain}})
```

@since{1.8.0}

The function `gpgme_op_decrypt_ext_start` initiates a `gpgme_op_decrypt_ext` operation. It can be completed by calling `gpgme_wait` on the context. @xref{Waiting For Completion}.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `@var{cipher}` or `@var{plain}` is not a valid pointer.

@end dectyfefun

```
@deftp {Data type} {gpgme_recipient_t}
@since{1.1.0}
```

This is a pointer to a structure used to store information about the recipient of an encrypted text which is decrypted in a `gpgme_op_decrypt` operation. This information (except for the status field) is even available before the operation finished successfully, for example in a passphrase callback. The structure contains the following members:

@table @code

@item gpgme\_recipient\_t next

This is a pointer to the next recipient structure in the linked list, or `NULL` if this is the last element.

@item gpgme\_pubkey\_algo\_t

The public key algorithm used in the encryption.

@item char \*keyid

This is the key ID of the key (in hexadecimal digits) used as recipient.

@item gpgme\_error\_t status

This is an error number with the error code GPG\_ERR\_NO\_SECKEY if the secret key for this recipient is not available, and 0 otherwise.

@end table

@end deftp

@deftp {Data type} {gpgme\_decrypt\_result\_t}

This is a pointer to a structure used to store the result of a @code{gpgme\_op\_decrypt} operation. After successfully decrypting data, you can retrieve the pointer to the result with @code{gpgme\_op\_decrypt\_result}. As with all result structures, it this structure shall be considered read-only and an application must not allocate such a structure on its own. The structure contains the following members:

@table @code

@item char \*unsupported\_algorithm

If an unsupported algorithm was encountered, this string describes the algorithm that is not supported.

@item unsigned int wrong\_key\_usage : 1

@since{0.9.0}

This is true if the key was not used according to its policy.

@item unsigned int legacy\_cipher\_nomdc : 1

@since{1.11.2}

The message was made by a legacy algorithm without any integrity protection. This might be an old but legitimate message.

@item unsigned int is\_mime : 1;

@since{1.11.0}

The message claims that the content is a MIME object.

@item unsigned int is\_de\_vs : 1;

@since{1.10.0}

The message was encrypted in a VS-NfD compliant way. This is a specification in Germany for a restricted communication level.

@item gpgme\_recipient\_t recipients

@since{1.1.0}

This is a linked list of recipients to which this message was encrypted.

@item char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer.

@item char \*session\_key

@since{1.8.0}

A textual representation (nul-terminated string) of the session key used in symmetric encryption of the message, if the context has been set to export session keys (see @code{gpgme\_set\_ctx\_flag, "export-session-key"}), and a session key was available for the most recent decryption operation. Otherwise, this is a null pointer.

You must not try to access this member of the struct unless

@code{gpgme\_set\_ctx\_flag (ctx, "export-session-key")} returns success or @code{gpgme\_get\_ctx\_flag (ctx, "export-session-key")} returns true (non-empty string).

@item char \*symkey\_algo

@since{1.11.0}

A string with the symmetric encryption algorithm and mode using the format "<algo>.<mode>". Note that the deprecated non-MDC encryption mode of OpenPGP is given as "PGPCFB".

@end table

@end deftp

@deftypefun gpgme\_decrypt\_result\_t gpgme\_op\_decrypt\_result (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_op\_decrypt\_result} returns a

@code{gpgme\_decrypt\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_decrypt} operation. The pointer is only valid if the last operation on the context was a

@code{gpgme\_op\_decrypt} or @code{gpgme\_op\_decrypt\_start} operation.

If the operation failed this might be a @code{NULL} pointer. The returned pointer is only valid until the next operation is started on the context.

@end deftypefun

@node Verify

@subsection Verify

@cindex verification

@cindex signature, verification

@cindex cryptographic operation, verification

@cindex cryptographic operation, signature check

@cindex signature notation data

@cindex notation data

@deftypefun gpgme\_error\_t gpgme\_op\_verify (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{sig}},

@w{gpgme\_data\_t @var{signed\_text}}, @w{gpgme\_data\_t @var{plain}})

The function @code{gpgme\_op\_verify} verifies that the signature in the

data object `@var{sig}` is a valid signature. If `@var{sig}` is a detached signature, then the signed text should be provided in `@var{signed_text}` and `@var{plain}` should be a null pointer. Otherwise, if `@var{sig}` is a normal (or cleartext) signature, `@var{signed_text}` should be a null pointer and `@var{plain}` should be a writable data object that will contain the plaintext after successful verification.

The results of the individual signature verifications can be retrieved with `@code{gpgme_op_verify_result}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the operation could be completed successfully, `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}`, `@var{sig}` or `@var{plain}` is not a valid pointer, `@code{GPG_ERR_NO_DATA}` if `@var{sig}` does not contain any data to verify, and passes through any errors that are reported by the crypto engine support routines.

`@end dectypedefun`

`@dectypedefun gpgme_error_t gpgme_op_verify_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{sig}}, @w{gpgme_data_t @var{signed_text}}, @w{gpgme_data_t @var{plain}})`

The function `@code{gpgme_op_verify_start}` initiates a `@code{gpgme_op_verify}` operation. It can be completed by calling `@code{gpgme_wait}` on the context. `@xref{Waiting For Completion}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the operation could be started successfully, `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}`, `@var{sig}` or `@var{plain}` is not a valid pointer, and `@code{GPG_ERR_NO_DATA}` if `@var{sig}` or `@var{plain}` does not contain any data to verify.

`@end dectypedefun`

`@deftp {Data type} {gpgme_sig_notation_t}`

This is a pointer to a structure used to store a part of the result of a `@code{gpgme_op_verify}` operation. The structure contains the following members:

`@table @code`

`@item gpgme_sig_notation_t next`

This is a pointer to the next new signature notation structure in the linked list, or `@code{NULL}` if this is the last element.

`@item char *name`

The name of the notation field. If this is `@code{NULL}`, then the member `@code{value}` will contain a policy URL.

`@item int name_len`

The length of the `@code{name}` field. For strings the length is

counted without the trailing binary zero.

@item char \*value

The value of the notation field. If @code{name} is @code{NULL}, then this is a policy URL.

@item int value\_len

The length of the @code{value} field. For strings the length is counted without the trailing binary zero.

@item gpgme\_sig\_notation\_flags\_t flags

The accumulated flags field. This field contains the flags associated with the notation data in an accumulated form which can be used as an argument to the function @code{gpgme\_sig\_notation\_add}. The value @code{flags} is a bitwise-or combination of one or multiple of the following bit values:

@table @code

@item GPGME\_SIG\_NOTATION\_HUMAN\_READABLE

@since{1.1.0}

The @code{GPGME\_SIG\_NOTATION\_HUMAN\_READABLE} symbol specifies that the notation data is in human readable form

@item GPGME\_SIG\_NOTATION\_CRITICAL

@since{1.1.0}

The @code{GPGME\_SIG\_NOTATION\_CRITICAL} symbol specifies that the notation data is critical.

@end table

@item unsigned int human\_readable : 1

This is true if the @code{GPGME\_SIG\_NOTATION\_HUMAN\_READABLE} flag is set and false otherwise. This flag is only valid for notation data, not for policy URLs.

@item unsigned int critical : 1

This is true if the @code{GPGME\_SIG\_NOTATION\_CRITICAL} flag is set and false otherwise. This flag is valid for notation data and policy URLs.

@end table

@end deftp

@deftp {Data type} {gpgme\_signature\_t}

This is a pointer to a structure used to store a part of the result of a @code{gpgme\_op\_verify} operation. The structure contains the following members:

@table @code

@item gpgme\_signature\_t next

This is a pointer to the next new signature structure in the linked list, or @code{NULL} if this is the last element.

@item gpgme\_sigsum\_t summary

This is a bit vector giving a summary of the signature status. It provides an easy interface to a defined semantic of the signature status. Checking just one bit is sufficient to see whether a signature is valid without any restrictions. This means that you can check for GPGME\_SIGSUM\_VALID like this:

@example

```
if ((sig.summary & GPGME_SIGSUM_VALID))
```

```
@{
```

```
..do stuff if valid..
```

```
@}
```

```
else
```

```
@{
```

```
..do stuff if not fully valid..
```

```
@}
```

```
@end example
```

The defined bits are:

@table @code

@item GPGME\_SIGSUM\_VALID

The signature is fully valid.

@item GPGME\_SIGSUM\_GREEN

The signature is good but one might want to display some extra information. Check the other bits.

@item GPGME\_SIGSUM\_RED

The signature is bad. It might be useful to check other bits and display more information, i.e. a revoked certificate might not render a signature invalid when the message was received prior to the cause for the revocation.

@item GPGME\_SIGSUM\_KEY\_REVOKED

The key or at least one certificate has been revoked.

@item GPGME\_SIGSUM\_KEY\_EXPIRED

The key or one of the certificates has expired. It is probably a good idea to display the date of the expiration.

@item GPGME\_SIGSUM\_SIG\_EXPIRED

The signature has expired.

@item GPGME\_SIGSUM\_KEY\_MISSING  
Can't verify due to a missing key or certificate.

@item GPGME\_SIGSUM\_CRL\_MISSING  
The CRL (or an equivalent mechanism) is not available.

@item GPGME\_SIGSUM\_CRL\_TOO\_OLD  
Available CRL is too old.

@item GPGME\_SIGSUM\_BAD\_POLICY  
A policy requirement was not met.

@item GPGME\_SIGSUM\_SYS\_ERROR  
A system error occurred.

@item GPGME\_SIGSUM\_TOFU\_CONFLICT  
A TOFU conflict was detected.  
@end table

@item char \*fpr  
This is the fingerprint or key ID of the signature.

@item gpgme\_error\_t status  
This is the status of the signature. In particular, the following status codes are of interest:

@table @code

@item GPG\_ERR\_NO\_ERROR

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

@item GPG\_ERR\_SIG\_EXPIRED

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

@item GPG\_ERR\_KEY\_EXPIRED

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

@item GPG\_ERR\_CERT\_REVOKED

This status indicates that the signature is valid but the key used to verify the signature has been revoked. For the combined result this status means that all signatures are valid and all keys are revoked.

@item GPG\_ERR\_BAD\_SIGNATURE

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

@item GPG\_ERR\_NO\_PUBKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

@item GPG\_ERR\_GENERAL

This status indicates that there was some other error which prevented the signature verification.

@end table

@item gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

@item unsigned long timestamp

The creation timestamp of this signature.

@item unsigned long exp\_timestamp

The expiration timestamp of this signature, or 0 if the signature does not expire.

@item unsigned int wrong\_key\_usage : 1

This is true if the key was not used according to its policy.

@item unsigned int pka\_trust : 2

This is set to the trust information gained by means of the PKA system.

Values are:

@table @code

@item 0

No PKA information available or verification not possible.

@item 1

PKA verification failed.

@item 2

PKA verification succeeded.

@item 3

Reserved for future use.

@end table

Depending on the configuration of the engine, this metric may also be reflected by the validity of the signature.

@item unsigned int chain\_model : 1

@since{1.1.6}

This is true if the validity of the signature has been checked using the chain model. In the chain model the time the signature has been created

must be within the validity period of the certificate and the time the certificate itself has been created must be within the validity period of the issuing certificate. In contrast the default validation model checks the validity of signature as well at the entire certificate chain at the current time.

@item gpgme\_validity\_t validity

The validity of the signature.

@item gpgme\_error\_t validity\_reason

If a signature is not valid, this provides a reason why.

@item gpgme\_pubkey\_algo\_t

The public key algorithm used to create this signature.

@item gpgme\_hash\_algo\_t

The hash algorithm used to create this signature.

@item char \*pka\_address

The mailbox from the PKA information or @code{NULL}.

@item gpgme\_key\_t key

@since{1.7.0}

An object describing the key used to create the signature. This key object may be incomplete in that it only conveys information available directly with a signature. It may also be @code{NULL} if such information is not readily available.

@end table

@end deftp

@deftp {Data type} {gpgme\_verify\_result\_t}

This is a pointer to a structure used to store the result of a @code{gpgme\_op\_verify} operation. After verifying a signature, you can retrieve the pointer to the result with @code{gpgme\_op\_verify\_result}. If the operation failed this might be a @code{NULL} pointer. The structure contains the following member:

@table @code

@item gpgme\_signature\_t signatures

A linked list with information about all signatures for which a verification was attempted.

@item char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer. Warning: The filename is

not covered by the signature.

```
@item unsigned int is_mime : 1;  
@since{1.11.0}
```

The message claims that the content is a MIME object. Warning: This flag is not covered by the signature.

```
@end table  
@end deftp
```

```
@deftypefun gpgme_verify_result_t gpgme_op_verify_result (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_op_verify_result` returns a `gpgme_verify_result_t` pointer to a structure holding the result of a `gpgme_op_verify` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_verify`, `gpgme_op_verify_start`, `gpgme_op_decrypt_verify` or `gpgme_op_decrypt_verify_start` operation, and if this operation finished successfully (for `gpgme_op_decrypt_verify` and `gpgme_op_decrypt_verify_start`, the error code `GPG_ERR_NO_DATA` counts as successful in this context). The returned pointer is only valid until the next operation is started on the context.

```
@end deftypefun
```

```
@node Decrypt and Verify
```

```
@subsection Decrypt and Verify
```

```
@cindex decryption and verification
```

```
@cindex verification and decryption
```

```
@cindex signature check
```

```
@cindex cryptographic operation, decryption and verification
```

```
@deftypefun gpgme_error_t gpgme_op_decrypt_verify (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{cipher}}, @w{gpgme_data_t @var{plain}})
```

The function `gpgme_op_decrypt_verify` decrypts the ciphertext in the data object `var{cipher}` and stores it into the data object `var{plain}`. If `var{cipher}` contains signatures, they will be verified.

After the operation completed, `gpgme_op_decrypt_result` and `gpgme_op_verify_result` can be used to retrieve more information about the signatures.

If the error code `GPG_ERR_NO_DATA` is returned, `var{cipher}` does not contain any data to decrypt. However, it might still be signed. The information about detected signatures is available with `gpgme_op_verify_result` in this case.

The function returns the error code `GPG_ERR_NO_ERROR` if the ciphertext could be decrypted successfully, `GPG_ERR_INV_VALUE` if `ctx`, `cipher` or `plain` is not a valid pointer, `GPG_ERR_NO_DATA` if `cipher` does not contain any data to decrypt, `GPG_ERR_DECRYPT_FAILED` if `cipher` is not a valid cipher text, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_decrypt\_verify\_start (@w{gpgme\_ctx\_t} ctx, @w{gpgme\_data\_t} cipher, @w{gpgme\_data\_t} plain)

The function `gpgme_op_decrypt_verify_start` initiates a `gpgme_op_decrypt_verify` operation. It can be completed by calling `gpgme_wait` on the context. @xref{Waiting For Completion}.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `ctx`, `cipher`, `plain` or `r_stat` is not a valid pointer, and `GPG_ERR_NO_DATA` if `cipher` does not contain any data to decrypt.

@end deftypefun

When processing mails it is sometimes useful to extract the actual mail address (the `addr-spec`) from a string. GPGME provides this helper function which uses the same semantics as the internal functions in GPGME and GnuPG:

@deftypefun @w{char \*} gpgme\_addrspec\_from\_uid (@w{const char \*} uid)

@since{1.7.1}

Return the mail address (called `addr-spec` in RFC-5322) from the string `uid` which is assumed to be a user id (called `address` in RFC-5322). All plain ASCII characters (i.e. those with bit 7 cleared) in the result are converted to lowercase. Caller must free the result using `gpgme_free`. Returns `NULL` if no valid address was found (in which case `ERRNO` is set to `EINVAL`) or for other errors.

@end deftypefun

@node Sign

@subsection Sign

@cindex signature, creation

@cindex sign

@cindex cryptographic operation, signing

A signature can contain signatures by one or more keys. The set of keys used to create a signatures is contained in a context, and is applied to all following signing operations in this context (until the set is changed).

@menu

\* Selecting Signers::           How to choose the keys to sign with.

\* Creating a Signature::       How to create a signature.

\* Signature Notation Data::   How to add notation data to a signature.

@end menu

@node Selecting Signers

@subsubsection Selecting Signers

@cindex signature, selecting signers

@cindex signers, selecting

The key or the keys used to create a signature are stored in the context. The following functions can be used to manipulate this list. If no signer has been set into the context a default key is used for signing.

```
@deftypefun void gpgme_signers_clear (@w{gpgme_ctx_t @var{ctx}})
```

The function @code{gpgme\_signers\_clear} releases a reference for each key on the signers list and removes the list of signers from the context @var{ctx}.

Every context starts with an empty list.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_signers_add (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t @var{key}})
```

The function @code{gpgme\_signers\_add} adds the key @var{key} to the list of signers in the context @var{ctx}.

Calling this function acquires an additional reference for the key.

@end deftypefun

```
@deftypefun @w{unsigned int} gpgme_signers_count (@w{const gpgme_ctx_t @var{ctx}})
@since{1.4.3}
```

The function @code{gpgme\_signers\_count} returns the number of signer keys in the context @var{ctx}.

@end deftypefun

@deftypefun gpgme\_key\_t gpgme\_signers\_enum (@w{const gpgme\_ctx\_t @var{ctx}}, @w{int @var{seq}})

The function @code{gpgme\_signers\_enum} returns the @var{seq}th key in the list of signers in the context @var{ctx}. An additional reference is acquired for the user.

If @var{seq} is out of range, @code{NULL} is returned.

@end deftypefun

@node Creating a Signature

@subsubsection Creating a Signature

@deftp {Data type} {enum gpgme\_sig\_mode\_t}

@tindex gpgme\_sig\_mode\_t

The @code{gpgme\_sig\_mode\_t} type is used to specify the desired type of a signature. The following modes are available:

@table @code

@item GPGME\_SIG\_MODE\_NORMAL

A normal signature is made, the output includes the plaintext and the signature.

@item GPGME\_SIG\_MODE\_DETACH

A detached signature is made.

@item GPGME\_SIG\_MODE\_CLEAR

A clear text signature is made. The @acronym{ASCII} armor and text mode settings of the context are ignored.

@end table

@end deftp

@deftypefun gpgme\_error\_t gpgme\_op\_sign (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{plain}},

@w{gpgme\_data\_t @var{sig}}, @w{gpgme\_sig\_mode\_t @var{mode}})

The function @code{gpgme\_op\_sign} creates a signature for the text in the data object @var{plain} and returns it in the data object

@var{sig}. The type of the signature created is determined by the

@acronym{ASCII} armor (or, if that is not set, by the encoding

specified for @var{sig}), the text mode attributes set for the context

@var{ctx} and the requested signature mode @var{mode}.

After the operation completed successfully, the result can be retrieved with @code{gpgme\_op\_sign\_result}.

If an S/MIME signed message is created using the CMS crypto engine, the number of certificates to include in the message can be specified with @code{gpgme\_set\_include\_certs}. @xref{Included Certificates}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the

signature could be created successfully, `GPG_ERR_INV_VALUE` if `ctx`, `plain` or `sig` is not a valid pointer, `GPG_ERR_NO_DATA` if the signature could not be created, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, `GPG_ERR_UNUSABLE_SECKEY` if there are invalid signers, and passes through any errors that are reported by the crypto engine support routines.

`end dectyfefun`

`dectyfefun gpgme_error_t gpgme_op_sign_start (@w{gpgme_ctx_t ctx}, @w{gpgme_data_t plain}, @w{gpgme_data_t sig}, @w{gpgme_sig_mode_t mode})`

The function `gpgme_op_sign_start` initiates a `gpgme_op_sign` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `ctx`, `plain` or `sig` is not a valid pointer.

`end dectyfefun`

`deftp {Data type} {gpgme_new_signature_t}`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_sign` operation. The structure contains the following members:

`table @code`

`item gpgme_new_signature_t next`

This is a pointer to the next new signature structure in the linked list, or `NULL` if this is the last element.

`item gpgme_sig_mode_t type`

The type of this signature.

`item gpgme_pubkey_algo_t pubkey_algo`

The public key algorithm used to create this signature.

`item gpgme_hash_algo_t hash_algo`

The hash algorithm used to create this signature.

`item unsigned int sig_class`

The signature class of this signature.

`item long int timestamp`

The creation timestamp of this signature.

`item char *fpr`

The fingerprint of the key which was used to create this signature.

`end table`

@end deftp

@deftp {Data type} {gpgme\_sign\_result\_t}

This is a pointer to a structure used to store the result of a

@code{gpgme\_op\_sign} operation. After successfully generating a signature, you can retrieve the pointer to the result with

@code{gpgme\_op\_sign\_result}. The structure contains the following members:

@table @code

@item gpgme\_invalid\_key\_t invalid\_signers

A linked list with information about all invalid keys for which a signature could not be created.

@item gpgme\_new\_signature\_t signatures

A linked list with information about all signatures created.

@end table

@end deftp

@deftypefun gpgme\_sign\_result\_t gpgme\_op\_sign\_result (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_op\_sign\_result} returns a

@code{gpgme\_sign\_result\_t} pointer to a structure holding the result

of a @code{gpgme\_op\_sign} operation. The pointer is only valid if the last operation on the context was a @code{gpgme\_op\_sign},

@code{gpgme\_op\_sign\_start}, @code{gpgme\_op\_encrypt\_sign} or

@code{gpgme\_op\_encrypt\_sign\_start} operation. If that operation

failed, the function might return a @code{NULL} pointer. The returned

pointer is only valid until the next operation is started on the

context.

@end deftypefun

@node Signature Notation Data

@subsubsection Signature Notation Data

@cindex notation data

@cindex signature notation data

@cindex policy URL

Using the following functions, you can attach arbitrary notation data

to a signature. This information is then available to the user when

the signature is verified.

@deftypefun void gpgme\_sig\_notation\_clear (@w{gpgme\_ctx\_t @var{ctx}})

@since{1.1.0}

The function @code{gpgme\_sig\_notation\_clear} removes the notation data

from the context @var{ctx}. Subsequent signing operations from this

context will not include any notation data.

Every context starts with an empty notation data list.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_sig_notation_add (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{name}}, @w{const char *@var{value}}, @w{gpgme_sig_notation_flags_t @var{flags}})
@since{1.1.0}
```

The function @code{gpgme\_sig\_notation\_add} adds the notation data with the name @var{name} and the value @var{value} to the context @var{ctx}.

Subsequent signing operations will include this notation data, as well as any other notation data that was added since the creation of the context or the last @code{gpgme\_sig\_notation\_clear} operation.

The arguments @var{name} and @var{value} must be @code{NUL}-terminated strings in human-readable form. The flag @code{GPGME\_SIG\_NOTATION\_HUMAN\_READABLE} is implied (non-human-readable notation data is currently not supported). The strings must be in UTF-8 encoding.

If @var{name} is @code{NULL}, then @var{value} should be a policy URL.

The function @code{gpgme\_sig\_notation\_add} returns the error code @code{GPG\_ERR\_NO\_ERROR} if the notation data could be added successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, or if @var{name}, @var{value} and @var{flags} are an invalid combination. The function also passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

```
@deftypefun gpgme_sig_notation_t gpgme_sig_notation_get (@w{const gpgme_ctx_t @var{ctx}})
@since{1.1.0}
```

The function @code{gpgme\_sig\_notation\_get} returns the linked list of notation data structures that are contained in the context @var{ctx}.

If @var{ctx} is not a valid pointer, or there is no notation data added for this context, @code{NULL} is returned.

@end deftypefun

@node Encrypt

@subsection Encrypt

@cindex encryption

@cindex cryptographic operation, encryption

One plaintext can be encrypted for several recipients at the same time. The list of recipients is created independently of any context, and then passed to the encryption operation.

@menu

\* Encrypting a Plaintext::     How to encrypt a plaintext.

@end menu

@node Encrypting a Plaintext

@subsubsection Encrypting a Plaintext

```
@deftypefun gpgme_error_t gpgme_op_encrypt (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t
@var{cipher}})
```

The function @code{gpgme\_op\_encrypt} encrypts the plaintext in the data object @var{plain} for the recipients @var{recp} and stores the ciphertext in the data object @var{cipher}. The type of the ciphertext created is determined by the @acronym{ASCII} armor (or, if that is not set, by the encoding specified for @var{cipher}) and the text mode attributes set for the context @var{ctx}.

@var{recp} must be a @code{NULL}-terminated array of keys. The user must keep references for all keys during the whole duration of the call (but see @code{gpgme\_op\_encrypt\_start} for the requirements with the asynchronous variant).

The value in @var{flags} is a bitwise-or combination of one or multiple of the following bit values:

@table @code

@item GPGME\_ENCRYPT\_ALWAYS\_TRUST

The @code{GPGME\_ENCRYPT\_ALWAYS\_TRUST} symbol specifies that all the recipients in @var{recp} should be trusted, even if the keys do not have a high enough validity in the keyring. This flag should be used with care; in general it is not a good idea to use any untrusted keys.

@item GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO

@since{1.2.0}

The @code{GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO} symbol specifies that no default or hidden default recipients as configured in the crypto backend should be included. This can be useful for managing different user profiles.

@item GPGME\_ENCRYPT\_NO\_COMPRESS

@since{1.5.0}

The `{GPGME_ENCRYPT_NO_COMPRESS}` symbol specifies that the plaintext shall not be compressed before it is encrypted. This is in some cases useful if the length of the encrypted message may reveal information about the plaintext.

@item GPGME\_ENCRYPT\_PREPARE

@itemx GPGME\_ENCRYPT\_EXPECT\_SIGN

The `{GPGME_ENCRYPT_PREPARE}` symbol is used with the UI Server protocol to prepare an encryption (i.e. sending the `{PREP_ENCRYPT}` command). With the `{GPGME_ENCRYPT_EXPECT_SIGN}` symbol the UI Server is advised to also expect a sign command.

@item GPGME\_ENCRYPT\_SYMMETRIC

@since{1.7.0}

The `{GPGME_ENCRYPT_SYMMETRIC}` symbol specifies that the output should be additionally encrypted symmetrically even if recipients are provided. This feature is only supported for the OpenPGP crypto engine.

@item GPGME\_ENCRYPT\_THROW\_KEYIDS

@since{1.8.0}

The `{GPGME_ENCRYPT_THROW_KEYIDS}` symbols requests that the identifiers for the decryption keys are not included in the ciphertext. On the receiving side, the use of this flag may slow down the decryption process because all available secret keys must be tried. This flag is only honored for OpenPGP encryption.

@item GPGME\_ENCRYPT\_WRAP

@since{1.8.0}

The `{GPGME_ENCRYPT_WRAP}` symbol specifies that the input is an OpenPGP message and not a plain data. This is the counterpart to `{GPGME_DECRYPT_UNWRAP}`.

@item GPGME\_ENCRYPT\_WANT\_ADDRESS

@since{1.11.0}

The `{GPGME_ENCRYPT_WANT_ADDRESS}` symbol requests that all supplied keys or key specifications include a syntactically valid mail address. If this is not the case the operation is not even tried and the error code `{GPG_ERR_INV_USER_ID}` is returned. Only the address part of the key specification is conveyed to the backend. As of now the key must be specified using the `{recpstring}` argument of the extended encrypt functions. This feature is currently only supported for the OpenPGP crypto engine.

@end table

If @code{GPG\_ERR\_UNUSABLE\_PUBKEY} is returned, some recipients in @var{recp} are invalid, but not all. In this case the plaintext might be encrypted for all valid recipients and returned in @var{cipher} (if this happens depends on the crypto engine). More information about the invalid recipients is available with @code{gpgme\_op\_encrypt\_result}.

If @var{recp} is @code{NULL}, symmetric rather than public key encryption is performed. Symmetrically encrypted cipher text can be deciphered with @code{gpgme\_op\_decrypt}. Note that in this case the crypto backend needs to retrieve a passphrase from the user. Symmetric encryption is currently only supported for the OpenPGP crypto backend.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the ciphertext could be created successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx}, @var{recp}, @var{plain} or @var{cipher} is not a valid pointer, @code{GPG\_ERR\_UNUSABLE\_PUBKEY} if @var{recp} contains some invalid recipients, @code{GPG\_ERR\_BAD\_PASSPHRASE} if the passphrase for the symmetric key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

The function @code{gpgme\_op\_encrypt\_start} initiates a @code{gpgme\_op\_encrypt} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

References to the keys only need to be held for the duration of this call. The user can release its references to the keys after this function returns, even if the operation is not yet finished.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation could be started successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx}, @var{rset}, @var{plain} or @var{cipher} is not a valid pointer, and @code{GPG\_ERR\_UNUSABLE\_PUBKEY} if @var{rset} does not contain any valid recipients.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_ext @
  (@w{gpgme_ctx_t @var{ctx}}, @
  @w{gpgme_key_t @var{recp}}[], @
  @w{const char *@var{recpstring}}), @
```

```
@w{gpgme_encrypt_flags_t @var{flags}}, @  
@w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}}
```

```
@since{1.11.0}
```

This is an extended version of `@code{gpgme_op_encrypt}` with `@var{recpstring}` as additional parameter. If `@var{recp}` is NULL and `@var{recpstring}` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `@var{recp}` the keys are given directly as strings and there is no need to first create key objects. Leading and trailing white space is removed from each line in `@var{recpstring}`. The keys are then passed verbatim to the backend engine.

For the OpenPGP backend several special keywords are supported to modify the operation. These keywords are given instead of a key specification. The currently supported keywords are:

```
@table @code  
@item --hidden  
@itemx --no-hidden
```

These keywords toggle between normal and hidden recipients for all following key specifications. When a hidden recipient is requested the gpg option `@option{-R}` (or `@option{-F}` in file mode) is used instead of `@option{-r}` (`@option{-f}` in file mode).

```
@item --file  
@itemx --no-file
```

These keywords toggle between regular and file mode for all following key specifications. In file mode the option `@option{-f}` or `@option{-F}` is passed to gpg. At least GnuPG version 2.1.14 is required to handle these options. The `@code{GPGME_ENCRYPT_WANT_ADDRESS}` flag is ignored in file mode.

```
@item --
```

This keyword disables all keyword detection up to the end of the string. All keywords are treated as verbatim arguments.

```
@end table
```

To create a `@var{recpstring}` it is often useful to employ a `strconcat` style function. For example this function creates a string to encrypt to two keys:

```
@example  
char *  
xbuild_recpsring (const char *key1, const char *key2)  
@{
```

```

char *result = gpgrt_strconcat ("--\n", key1, "\n", key2, NULL);
if (!result)
    @ { perror ("strconcat failed"); exit (2); @ }
return result;
@ }
@end example

```

Note the use of the double dash here; unless you want to specify a keyword, it is a good idea to avoid any possible trouble with key specifications starting with a double dash. The used `strconcat` function is available in Libgpg-error 1.28 and later; Libgpg-error (aka Gpgrt) is a dependency of GPGME. The number of arguments to `gpgrt_strconcat` is limited to 47 but that should always be sufficient. In case a larger and non-fixed number of keys are to be supplied the following code can be used:

```

@example
char *
xbuild_long_recpstring (void)
@ {
    gpgrt_stream_t memfp;
    const char *s;
    void *result;

    memfp = gpgrt_fopenmem (0, "w+b");
    if (!memfp)
        @ { perror ("fopenmem failed"); exit (2); @ }
    gpgrt_fputs ("--", memfp);
    while ((s = get_next_keyspec ()))
        @ {
            gpgrt_fputc ('\n', memfp);
            gpgrt_fputs (s, memfp);
        @ }
    gpgrt_fputc (0, memfp);
    if (gpgrt_ferror (memfp))
        @ { perror ("writing to memstream failed"); exit (2); @ }
    if (gpgrt_fclose_snatch (memfp, &result, NULL))
        @ { perror ("fclose_snatch failed"); exit (2); @ }
    return result;
@ }
@end example

```

In this example `get_next_keyspec` is expected to return the next key to be added to the string. Please take care: Encrypting to a large number of recipients is often questionable due to security reasons and also for the technicality that all keys are currently passed on the command line to `gpg` which has as a platform specific length limitation.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_ext_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{recp}[]}, @
   @w{const char *@var{recpstring}}, @
   @w{gpgme_encrypt_flags_t @var{flags}}, @
   @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

@since{1.11.0}

This is an extended version of @code{gpgme\_op\_encrypt\_start} with @var{recpstring} as additional parameter. If @var{recp} is NULL and @var{recpstring} is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to @var{recp} the keys are given directly as strings and there is no need to first create key objects. The keys are passed verbatim to the backend engine.

@end deftypefun

```
@deftp {Data type} {gpgme_encrypt_result_t}
```

This is a pointer to a structure used to store the result of a @code{gpgme\_op\_encrypt} operation. After successfully encrypting data, you can retrieve the pointer to the result with @code{gpgme\_op\_encrypt\_result}. The structure contains the following members:

```
@table @code
```

```
@item gpgme_invalid_key_t invalid_recipients
```

A linked list with information about all invalid keys for which the data could not be encrypted.

```
@end table
```

```
@end deftp
```

```
@deftypefun gpgme_encrypt_result_t gpgme_op_encrypt_result (@w{gpgme_ctx_t @var{ctx}})
```

The function @code{gpgme\_op\_encrypt\_result} returns a @code{gpgme\_encrypt\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_encrypt} operation. The pointer is only valid if the last operation on the context was a @code{gpgme\_op\_encrypt}, @code{gpgme\_op\_encrypt\_start}, @code{gpgme\_op\_sign} or @code{gpgme\_op\_sign\_start} operation. If this operation failed, this might be a @code{NULL} pointer. The returned pointer is only valid until the next operation is started on the context.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t
@var{cipher}})
```

The function `gpgme_op_encrypt_sign` does a combined encrypt and sign operation. It is used like `gpgme_op_encrypt`, but the ciphertext also contains signatures for the signers listed in `ctx`.

The combined encrypt and sign operation is currently only available for the OpenPGP crypto engine.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t
@var{cipher}})
```

The function `gpgme_op_encrypt_sign_start` initiates a `gpgme_op_encrypt_sign` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `ctx`, `rset`, `plain` or `cipher` is not a valid pointer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_ext @
  (@w{gpgme_ctx_t @var{ctx}}, @
  @w{gpgme_key_t @var{recp}}[], @
  @w{const char *@var{recpstring}}, @
  @w{gpgme_encrypt_flags_t @var{flags}}, @
  @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

```
@since{1.11.0}
```

This is an extended version of `gpgme_op_encrypt_sign` with `recpstring` as additional parameter. If `recp` is NULL and `recpstring` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `recp` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_ext_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
```

```
@w{gpgme_key_t @var{recp}[]}, @
@w{const char *@var{recpstring}}, @
@w{gpgme_encrypt_flags_t @var{flags}}, @
@w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}}
```

```
@since{1.11.0}
```

This is an extended version of `gpgme_op_encrypt_sign_start` with `@var{recpstring}` as additional parameter. If `@var{recp}` is NULL and `@var{recpstring}` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `@var{recp}` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

```
@end deftypefun
```

```
@node Miscellaneous
```

```
@section Miscellaneous operations
```

Here are some support functions which are sometimes useful.

```
@menu
```

- \* Running other Programs:: Running other Programs
- \* Using the Assuan protocol:: Using the Assuan protocol
- \* Checking for updates:: How to check for software updates

```
@end menu
```

```
@node Running other Programs
```

```
@subsection Running other Programs
```

GPGME features an internal subsystem to run the actual backend engines. Along with data abstraction object this subsystem can be used to run arbitrary simple programs which even need not be related to cryptographic features. It may for example be used to run tools which are part of the GnuPG system but are not directly accessible with the GPGME API.

```
@deftypefun gpgme_error_t gpgme_op_spawn @
```

```
(@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{file}}, @
@w{const char *@var{argv}[]}, @w{gpgme_data_t @var{datain}}, @
@w{gpgme_data_t @var{dataout}}, @w{gpgme_data_t @var{dataerr}}, @
@w{unsigned int @var{flags}})
```

```
@since{1.5.0}
```

The function `gpgme_op_spawn` runs the program `file` with the arguments taken from the NULL terminated array `argv`. If no arguments are required `argv` may be given as `NULL`. In the latter case or if `argv[0]` is the empty string, GPGME uses the basename of `file` for `argv[0]`. The file descriptors `stdin`, `stdout`, and `stderr` are connected to the data objects `datain`, `dataout`, and `dataerr`. If NULL is passed for one of these data objects the corresponding file descriptor is connected to `/dev/null`.

The value in `flags` is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_SPAWN_DETACHED
@since{1.5.0}
```

Under Windows this flag inhibits the allocation of a new console for the program. This is useful for a GUI application which needs to call a command line helper tool.

```
@item GPGME_SPAWN_ALLOW_SET_FG
@since{1.5.0}
```

Under Windows this flag allows the called program to put itself into the foreground.

```
@end table
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_spawn_start @
  (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{file}}, @
   @w{const char *@var{argv}[]}, @w{gpgme_data_t @var{datain}}, @
   @w{gpgme_data_t @var{dataout}}, @w{gpgme_data_t @var{dataerr}}, @
   @w{unsigned int @var{flags}})
```

```
@since{1.5.0}
```

This is the asynchronous variant of `gpgme_op_spawn`.

```
@end deftypefun
```

```
@node Using the Assuan protocol
@subsection Using the Assuan protocol
```

The Assuan protocol can be used to talk to arbitrary Assuan servers. By default it is connected to the GnuPG agent, but it may be connected to arbitrary servers by using `gpgme_ctx_set_engine_info`,

passing the location of the servers socket as `@var{file_name}` argument, and an empty string as `@var{home_dir}` argument.

The Assuan protocol functions use three kinds of callbacks to transfer data:

```
@deftp {Data type} {gpgme_error_t (*gpgme_assuan_data_cb_t) @
    (@w{void *@var{opaque}}, @w{const void *@var{data}}, @
    @w{size_t @var{datalen}})}
```

@since{1.2.0}

This callback receives any data sent by the server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{data}` of length `@var{datalen}` refers to the data sent.

```
@end deftp
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_assuan_inquire_cb_t) @
    (@w{void *@var{opaque}}, @w{const char *@var{name}}, @
    @w{const char *@var{args}}, @w{gpgme_data_t *@var{r_data}})}
```

@since{1.2.0}

This callback is used to provide additional data to the Assuan server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{name}` and `@var{args}` specify what kind of data the server requested, and `@var{r_data}` is used to return the actual data.

Note: Returning data is currently not implemented in `@acronym{GPGME}`.

```
@end deftp
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_assuan_status_cb_t) @
    (@w{void *@var{opaque}}, @w{const char *@var{status}}, @
    @w{const char *@var{args}})}
```

@since{1.2.0}

This callback receives any status lines sent by the server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{status}` and `@var{args}` denote the status update sent.

```
@end deftp
```

```
@deftypedefun gpgme_error_t gpgme_op_assuan_transact_start @
    (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{command}}, @
    @w{gpgme_assuan_data_cb_t @var{data_cb}}, @
    @w{void * @var{data_cb_value}}, @
```

```
@w{gpgme_assuan_inquire_cb_t @var{inquire_cb}}, @
@w{void * @var{inquire_cb_value}}, @
@w{gpgme_assuan_status_cb_t @var{status_cb}}, @
@w{void * @var{status_cb_value}})
```

@since{1.2.0}

Send the Assuan @var{command} and return results via the callbacks.  
Any callback may be @code{NULL}. The result of the operation may be  
retrieved using @code{gpgme\_wait\_ext}.

Asynchronous variant.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_assuan_transact_ext @
(@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{command}}, @
@w{gpgme_assuan_data_cb_t @var{data_cb}}, @
@w{void * @var{data_cb_value}}, @
@w{gpgme_assuan_inquire_cb_t @var{inquire_cb}}, @
@w{void * @var{inquire_cb_value}}, @
@w{gpgme_assuan_status_cb_t @var{status_cb}}, @
@w{void * @var{status_cb_value}}, @
@w{gpgme_error_t *@var{op_err}})
```

Send the Assuan @var{command} and return results via the callbacks.  
The result of the operation is returned in @var{op\_err}.

Synchronous variant.

@end deftypefun

@node Checking for updates

@subsection How to check for software updates

The GnuPG Project operates a server to query the current versions of  
software packages related to GnuPG. GPGME can be used to  
access this online database and check whether a new version of a  
software package is available.

```
@deftp {Data type} {gpgme_query_swdb_result_t}
@since{1.8.0}
```

This is a pointer to a structure used to store the result of a  
@code{gpgme\_op\_query\_swdb} operation. After success full call to that  
function, you can retrieve the pointer to the result with  
@code{gpgme\_op\_query\_swdb\_result}. The structure contains the  
following member:

@table @code

@item name

This is the name of the package.

@item iversion

The currently installed version or an empty string. This value is either a copy of the argument given to @code{gpgme\_op\_query\_swdb} or the version of the installed software as figured out by GPGME or GnuPG.

@item created

This gives the date the file with the list of version numbers has originally be created by the GnuPG project.

@item retrieved

This gives the date the file was downloaded.

@item warning

If this flag is set either an error has occurred or some of the information in this structure are not properly set. For example if the version number of the installed software could not be figured out, the @code{update} flag may not reflect a required update status.

@item update

If this flag is set an update of the software is available.

@item urgent

If this flag is set an available update is important.

@item noinfo

If this flag is set, no valid information could be retrieved.

@item unknown

If this flag is set the given @code{name} is not known.

@item toold

If this flag is set the available information is not fresh enough.

@item error

If this flag is set some other error has occurred.

@item version

The version string of the latest released version.

@item reldate

The release date of the latest released version.

@end table

@end deftp

```
@deftypefun gpgme_error_t gpgme_op_query_swdb @
    (@w{gpgme_ctx_t @var{ctx}}, @
    @w{const char *@var{name}}, @
    @w{const char *@var{iversion}}, @
    @w{gpgme_data_t @var{reserved}})
```

```
@since{1.8.0}
```

Query the software version database for software package @var{name} and check against the installed version given by @var{iversion}. If @var{iversion} is given as @code{NULL} a check is only done if GPGME can figure out the version by itself (for example when using "gpgme" or "gnupg"). If @code{NULL} is used for @var{name} the current gpgme version is checked. @var{reserved} must be set to 0.

```
@end deftypefun
```

```
@deftypefun gpgme_query_swdb_result_t gpgme_op_query_swdb_result @
    (@w{gpgme_ctx_t @var{ctx}})
```

```
@since{1.8.0}
```

The function @code{gpgme\_op\_query\_swdb\_result} returns a @code{gpgme\_query\_swdb\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_query\_swdb} operation. The pointer is only valid if the last operation on the context was a successful call to @code{gpgme\_op\_query\_swdb}. If that call failed, the result might be a @code{NULL} pointer. The returned pointer is only valid until the next operation is started on the context @var{ctx}.

```
@end deftypefun
```

```
@noindent
```

Here is an example on how to check whether GnuPG is current:

```
@example
```

```
#include <gpgme.h>
```

```
int
```

```
main (void)
```

```
@{
```

```
    gpg_error_t err;
```

```
    gpgme_ctx_t ctx;
```

```
    gpgme_query_swdb_result_t result;
```

```
    gpgme_check_version (NULL);
```

```
    err = gpgme_new (&ctx);
```

```
    if (err)
```

```

fprintf (stderr, "error creating context: %s\n", gpg_strerror (err));
else
@{
    gpgme_set_protocol (ctx, GPGME_PROTOCOL_GPGCONF);

    err = gpgme_op_query_swdb (ctx, "gnupg", NULL, 0);
    if (err)
        fprintf (stderr, "error querying swdb: %s\n", gpg_strerror (err));
    else
        @{
            result = gpgme_op_query_swdb_result (ctx);
            if (!result)
                fprintf (stderr, "error querying swdb\n");
            if (!result->warning && !result->update)
                printf ("GnuPG version %s is current\n",
                    result->iversion);
            else if (!result->warning && result->update)
                printf ("GnuPG version %s can be updated to %s\n",
                    result->iversion, result->version);
            else
                fprintf (stderr, "error finding the update status\n");
        @}
        gpgme_release (ctx);
    @}
return 0;
@}
@end example

```

@node Run Control

@section Run Control

@cindex run control

@cindex cryptographic operation, running

@acronym{GPGME} supports running operations synchronously and asynchronously. You can use asynchronous operation to set up a context up to initiating the desired operation, but delay performing it to a later point.

Furthermore, you can use an external event loop to control exactly when @acronym{GPGME} runs. This ensures that @acronym{GPGME} only runs when necessary and also prevents it from blocking for a long time.

@menu

- \* Waiting For Completion::     Waiting until an operation is completed.
- \* Using External Event Loops::   Advanced control over what happens when.
- \* Cancellation::                 How to end pending operations prematurely.

@end menu

@node Waiting For Completion

@subsection Waiting For Completion

@cindex cryptographic operation, wait for

@cindex wait for completion

```
@deftypefun gpgme_ctx_t gpgme_wait (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_error_t *@var{status}},  
@w{int @var{hang}})
```

The function `gpgme_wait` continues the pending operation within the context `@var{ctx}`. In particular, it ensures the data exchange between `GPGME` and the crypto backend and watches over the run time status of the backend process.

If `@var{hang}` is true, the function does not return until the operation is completed or cancelled. Otherwise the function will not block for a long time.

The error status of the finished operation is returned in `@var{status}` if `gpgme_wait` does not return `NULL`.

The `@var{ctx}` argument can be `NULL`. In that case, `gpgme_wait` waits for any context to complete its operation.

`gpgme_wait` can be used only in conjunction with any context that has a pending operation initiated with one of the `gpgme_op_*_start` functions except `gpgme_op_keylist_start` and `gpgme_op_trustlist_start` (for which you should use the corresponding `gpgme_op_*_next` functions). If `@var{ctx}` is `NULL`, all of such contexts are waited upon and possibly returned. Synchronous operations running in parallel, as well as key and trust item list operations, do not affect `gpgme_wait`.

In a multi-threaded environment, only one thread should ever call `gpgme_wait` at any time, regardless of whether `@var{ctx}` is specified or not. This means that all calls to this function should be fully synchronized by locking primitives. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

The function returns the `@var{ctx}` of the context which has finished the operation. If `@var{hang}` is false, and the timeout expires, `NULL` is returned and `*status` will be set to 0. If an error occurs, `NULL` is returned and the error is returned in `*status`.

@end deftypefun

@node Using External Event Loops  
@subsection Using External Event Loops  
@cindex event loop, external

@acronym{GPGME} hides the complexity of the communication between the library and the crypto engine. The price of this convenience is that the calling thread can block arbitrarily long waiting for the data returned by the crypto engine. In single-threaded programs, in particular if they are interactive, this is an unwanted side-effect. OTOH, if @code{gpgme\_wait} is used without the @var{hang} option being enabled, it might be called unnecessarily often, wasting CPU time that could be used otherwise.

The I/O callback interface described in this section lets the user take control over what happens when. @acronym{GPGME} will provide the user with the file descriptors that should be monitored, and the callback functions that should be invoked when a file descriptor is ready for reading or writing. It is then the user's responsibility to decide when to check the file descriptors and when to invoke the callback functions. Usually this is done in an event loop, that also checks for events in other parts of the program. If the callback functions are only called when the file descriptors are ready, @acronym{GPGME} will never block. This gives the user more control over the program flow, and allows to perform other tasks when @acronym{GPGME} would block otherwise.

By using this advanced mechanism, @acronym{GPGME} can be integrated smoothly into GUI toolkits like GTK+ even for single-threaded programs.

@menu  
\* I/O Callback Interface:: How I/O callbacks are registered.  
\* Registering I/O Callbacks:: How to use I/O callbacks for a context.  
\* I/O Callback Example:: An example how to use I/O callbacks.  
\* I/O Callback Example GTK+:: How to use @acronym{GPGME} with GTK+.  
\* I/O Callback Example GDK:: How to use @acronym{GPGME} with GDK.  
\* I/O Callback Example Qt:: How to use @acronym{GPGME} with Qt.  
@end menu

@node I/O Callback Interface  
@subsubsection I/O Callback Interface

@defftp {Data type} {gpgme\_error\_t (\*gpgme\_io\_cb\_t) (@w{void \*}@var{data}}, @w{int @var{fd}})}  
@tindex gpgme\_io\_cb\_t

The @code{gpgme\_io\_cb\_t} type is the type of functions which @acronym{GPGME} wants to register as I/O callback handlers using the @code{gpgme\_register\_io\_cb\_t} functions provided by the user.

@var{data} and @var{fd} are provided by @acronym{GPGME} when the I/O callback handler is registered, and should be passed through to the handler when it is invoked by the user because it noticed activity on the file descriptor @var{fd}.

The callback handler always returns @code{0}, but you should consider the return value to be reserved for later use.

@end deftp

```
@deftp {Data type} {gpgme_error_t (*gpgme_register_io_cb_t) (@w{void *@var{data}}, @w{int @var{fd}},  
@w{int @var{dir}}, @w{gpgme_io_cb_t @var{fnc}}, @w{void *@var{fnc_data}}, @w{void **@var{tag}})}  
@tindex gpgme_register_io_cb_t
```

The @code{gpgme\_register\_io\_cb\_t} type is the type of functions which can be called by @acronym{GPGME} to register an I/O callback function @var{fnc} for the file descriptor @var{fd} with the user.

@var{fnc\_data} should be passed as the first argument to @var{fnc} when the handler is invoked (the second argument should be @var{fd}).

If @var{dir} is 0, @var{fnc} should be called by the user when @var{fd} is ready for writing. If @var{dir} is 1, @var{fnc} should be called when @var{fd} is ready for reading.

@var{data} was provided by the user when registering the @code{gpgme\_register\_io\_cb\_t} function with @acronym{GPGME} and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the event loop to which the file descriptor should be added.

@acronym{GPGME} will call this function when a crypto operation is initiated in a context for which the user has registered I/O callback handler functions with @code{gpgme\_set\_io\_cbs}. It can also call this function when it is in an I/O callback handler for a file descriptor associated to this context.

The user should return a unique handle in @var{tag} identifying this I/O callback registration, which will be passed to the @code{gpgme\_register\_io\_cb\_t} function without interpretation when the file descriptor should not be monitored anymore.

@end deftp

```
@deftp {Data type} {void (*gpgme_remove_io_cb_t) (@w{void *@var{tag}})}
```

The @code{gpgme\_remove\_io\_cb\_t} type is the type of functions which can be called by @acronym{GPGME} to remove an I/O callback handler that was registered before. @var{tag} is the handle that was returned by the @code{gpgme\_register\_io\_cb\_t} for this I/O callback.

@acronym{GPGME} can call this function when a crypto operation is in an I/O callback. It will also call this function when the context is

destroyed while an operation is pending.

@end deftp

@deftp {Data type} {enum gpgme\_event\_io\_t}

@tindex gpgme\_event\_io\_t

The @code{gpgme\_event\_io\_t} type specifies the type of an event that is reported to the user by @acronym{GPGME} as a consequence of an I/O operation. The following events are defined:

@table @code

@item GPGME\_EVENT\_START

The operation is fully initialized now, and you can start to run the registered I/O callback handlers now. Note that registered I/O callback handlers must not be run before this event is signalled.

@var{type\_data} is @code{NULL} and reserved for later use.

@item GPGME\_EVENT\_DONE

The operation is finished, the last I/O callback for this operation was removed. The accompanying @var{type\_data} points to a @code{struct gpgme\_io\_event\_done\_data} variable that contains the status of the operation that finished. This event is signalled after the last I/O callback has been removed.

@item GPGME\_EVENT\_NEXT\_KEY

In a @code{gpgme\_op\_keylist\_start} operation, the next key was received from the crypto engine. The accompanying @var{type\_data} is a @code{gpgme\_key\_t} variable that contains the key with one reference for the user.

@item GPGME\_EVENT\_NEXT\_TRUSTITEM

In a @code{gpgme\_op\_trustlist\_start} operation, the next trust item was received from the crypto engine. The accompanying @var{type\_data} is a @code{gpgme\_trust\_item\_t} variable that contains the trust item with one reference for the user.

@end table

@end deftp

@deftp {Data type} {void (\*gpgme\_event\_io\_cb\_t) (@w{void \*}@var{data}), @w{gpgme\_event\_io\_t}@var{type}}, @w{void \*}@var{type\_data}}}

The @code{gpgme\_event\_io\_cb\_t} type is the type of functions which can be called by @acronym{GPGME} to signal an event for an operation running in a context which has I/O callback functions registered by the user.

@var{data} was provided by the user when registering the

@code{gpgme\_event\_io\_cb\_t} function with @acronym{GPGME} and will always be passed as the first argument when registering a callback function.

For example, the user can use this to determine the context in which this event has occurred.

@var{type} will specify the type of event that has occurred.  
@var{type\_data} specifies the event further, as described in the above list of possible @code{gpgme\_event\_io\_t} types.

@acronym{GPGME} can call this function in an I/O callback handler.  
@end deftp

@node Registering I/O Callbacks  
@subsubsection Registering I/O Callbacks

@deftp {Data type} {struct gpgme\_io\_cbs}  
@tindex gpgme\_event\_io\_t  
This structure is used to store the I/O callback interface functions described in the previous section. It has the following members:

@table @code  
@item gpgme\_register\_io\_cb\_t add  
This is the function called by @acronym{GPGME} to register an I/O callback handler. It must be specified.

@item void \*add\_priv  
This is passed as the first argument to the @code{add} function when it is called by @acronym{GPGME}. For example, it can be used to determine the event loop to which the file descriptor should be added.

@item gpgme\_remove\_io\_cb\_t remove  
This is the function called by @acronym{GPGME} to remove an I/O callback handler. It must be specified.

@item gpgme\_event\_io\_cb\_t event  
This is the function called by @acronym{GPGME} to signal an event for an operation. It must be specified, because at least the start event must be processed.

@item void \*event\_priv  
This is passed as the first argument to the @code{event} function when it is called by @acronym{GPGME}. For example, it can be used to determine the context in which the event has occurred.

@end table  
@end deftp

@deftypedef void gpgme\_set\_io\_cbs (@w{gpgme\_ctx\_t @var{ctx}}, @w{struct gpgme\_io\_cbs \*@var{io\_cbs}})  
The function @code{gpgme\_set\_io\_cbs} enables the I/O callback interface for the context @var{ctx}. The I/O callback functions are specified by @var{io\_cbs}.

If `@var{io_cbs}->@code{add}` is `@code{NULL}`, the I/O callback interface is disabled for the context, and normal operation is restored.

```
@end deftypefun
```

```
@deftypefun void gpgme_get_io_cbs (@w{gpgme_ctx_t @var{ctx}}, @w{struct gpgme_io_cbs *@var{io_cbs}})
```

The function `@code{gpgme_get_io_cbs}` returns the I/O callback functions set with `@code{gpgme_set_io_cbs}` in `@var{io_cbs}`.

```
@end deftypefun
```

```
@node I/O Callback Example
```

```
@subsubsection I/O Callback Example
```

To actually use an external event loop, you have to implement the I/O callback functions that are used by `@acronym{GPGME}` to register and unregister file descriptors. Furthermore, you have to actually monitor these file descriptors for activity and call the appropriate I/O callbacks.

The following example illustrates how to do that. The example uses locking to show in which way the callbacks and the event loop can run concurrently. For the event loop, we use a fixed array. For a real-world implementation, you should use a dynamically sized structure because the number of file descriptors needed for a crypto operation in `@acronym{GPGME}` is not predictable.

```
@example
```

```
#include <assert.h>
```

```
#include <errno.h>
```

```
#include <stdlib.h>
```

```
#include <pthread.h>
```

```
#include <sys/types.h>
```

```
#include <gpgme.h>
```

```
/* The following structure holds the result of a crypto operation. */
```

```
struct op_result
```

```
@{
```

```
int done;
```

```
gpgme_error_t err;
```

```
@};
```

```
/* The following structure holds the data associated with one I/O callback. */
```

```
struct one_fd
```

```
@{
```

```
int fd;
```

```
int dir;
```

```
gpgme_io_cb_t fnc;
```

```

void *fnc_data;
void *loop;
@ };

struct event_loop
@ {
pthread_mutex_t lock;
#define MAX_FDS 32
/* Unused slots are marked with FD being -1. */
struct one_fd fds[MAX_FDS];
@ };
@end example

```

The following functions implement the I/O callback interface.

```

@example
gpgme_error_t
add_io_cb (void *data, int fd, int dir, gpgme_io_cb_t fnc, void *fnc_data,
          void **r_tag)
@ {
struct event_loop *loop = data;
struct one_fd *fds = loop->fds;
int i;

pthread_mutex_lock (&loop->lock);
for (i = 0; i < MAX_FDS; i++)
  @ {
    if (fds[i].fd == -1)
  @ {
    fds[i].fd = fd;
    fds[i].dir = dir;
    fds[i].fnc = fnc;
    fds[i].fnc_data = fnc_data;
    fds[i].loop = loop;
    break;
  @ }
  @ }
pthread_mutex_unlock (&loop->lock);
if (i == MAX_FDS)
  return gpg_error (GPG_ERR_GENERAL);
*r_tag = &fds[i];
return 0;
@ }

void
remove_io_cb (void *tag)
@ {
struct one_fd *fd = tag;

```

```

struct event_loop *loop = fd->loop;

pthread_mutex_lock (&loop->lock);
fd->fd = -1;
pthread_mutex_unlock (&loop->lock);
@}

void
event_io_cb (void *data, gpgme_event_io_t type, void *type_data)
@{
    struct op_result *result = data;

    /* We don't support list operations here. */
    if (type == GPGME_EVENT_DONE)
        @{
            result->done = 1;
            result->err = *type_data;
        @}
    @}
@end example

```

The final missing piece is the event loop, which will be presented next. We only support waiting for the success of a single operation.

```

@example
int
do_select (struct event_loop *loop)
@{
    fd_set rfd;
    fd_set wfd;
    int i, n;
    int any = 0;
    struct timeval tv;
    struct one_fd *fdlist = loop->fds;

    pthread_mutex_lock (&loop->lock);
    FD_ZERO (&rfd);
    FD_ZERO (&wfd);
    for (i = 0; i < MAX_FDS; i++)
        if (fdlist[i].fd != -1)
            FD_SET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfd);
    pthread_mutex_unlock (&loop->lock);

    tv.tv_sec = 0;
    tv.tv_usec = 1000;

    do
        @{

```

```

    n = select (FD_SETSIZE, &rfd, &wfd, NULL, &tv);
    @}
while (n < 0 && errno == EINTR);

if (n < 0)
    return n; /* Error or timeout. */

pthread_mutex_lock (&loop->lock);
for (i = 0; i < MAX_FDS && n; i++)
    @{
        if (fdlist[i].fd != -1)
    @{
        if (FD_ISSET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfd))
            @{
                assert (n);
                n--;
                any = 1;
                /* The I/O callback handler can register/remove callbacks,
                   so we have to unlock the file descriptor list. */
                pthread_mutex_unlock (&loop->lock);
                (*fdlist[i].fnc) (fdlist[i].fnc_data, fdlist[i].fd);
                pthread_mutex_lock (&loop->lock);
            @}
        @}
    @}
    @}
pthread_mutex_unlock (&loop->lock);
return any;
@}

void
wait_for_op (struct event_loop *loop, struct op_result *result)
@{
    int ret;

    do
        @{
            ret = do_select (loop);
        @}
    while (ret >= 0 && !result->done);
@}
@end example

```

The main function shows how to put it all together.

```

@example
int
main (int argc, char *argv[])
@{

```

```

struct event_loop loop;
struct op_result result;
gpgme_ctx_t ctx;
gpgme_error_t err;
gpgme_data_t sig, text;
int i;
pthread_mutexattr_t attr;
struct gpgme_io_cbs io_cbs =
@{
    add_io_cb,
    &loop,
    remove_io_cb,
    event_io_cb,
    &result
@};

init_gpgme ();

/* Initialize the loop structure. */

/* The mutex must be recursive, since remove_io_cb (which acquires a
   lock) can be called while holding a lock acquired in do_select. */
pthread_mutexattr_init (&attr);
pthread_mutexattr_settype (&attr, PTHREAD_MUTEX_RECURSIVE);
pthread_mutex_init (&loop.lock, &attr);
pthread_mutexattr_destroy (&attr);

for (i = 0; i < MAX_FDS; i++)
    loop.fds[i].fd = -1;

/* Initialize the result structure. */
result.done = 0;

err = gpgme_data_new_from_file (&sig, "signature", 1);
if (!err)
    err = gpgme_data_new_from_file (&text, "text", 1);
if (!err)
    err = gpgme_new (&ctx);
if (!err)
@{
    gpgme_set_io_cbs (ctx, &io_cbs);
    err = gpgme_op_verify_start (ctx, sig, text, NULL);
@}
if (err)
@{
    fprintf (stderr, "gpgme error: %s: %s\n",
            gpgme_strerror (err), gpgme_strerror (err));
    exit (1);
@}

```

```

@}

wait_for_op (&loop, &result);
if (!result.done)
@{
    fprintf (stderr, "select error\n");
    exit (1);
@}
if (!result.err)
@{
    fprintf (stderr, "verification failed: %s: %s\n",
            gpgme_strsource (result.err), gpgme_strerror (result.err));
    exit (1);
@}
/* Evaluate verify result. */
@dots{}
return 0;
@}
@end example

```

```

@node I/O Callback Example GTK+
@subsection I/O Callback Example GTK+
@cindex GTK+, using @acronym{GPGME} with

```

The I/O callback interface can be used to integrate @acronym{GPGME} with the GTK+ event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GTK+ specific setup.

```

@example
#include <gtk/gtk.h>

struct my_gpgme_io_cb
@{
    gpgme_io_cb_t fnc;
    void *fnc_data;
    guint input_handler_id
@};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
@{
    struct my_gpgme_io_cb *iocb = data;
    (*(iocb->fnc)) (iocb->data, source);
@}

```

```

void
my_gpgme_remove_io_cb (void *data)
@{
    struct my_gpgme_io_cb *iocb = data;
    gtk_input_remove (data->input_handler_id);
@}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
@{
    struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
    iocb->fnc = fnc;
    iocb->data = fnc_data;
    iocb->input_handler_id = gtk_input_add_full (fd, dir
                                                ? GDK_INPUT_READ
                                                : GDK_INPUT_WRITE,
                                                my_gpgme_io_callback,
                                                0, iocb, NULL);

    *tag = iocb;
    return 0;
@}
@end example

```

```

@node I/O Callback Example GDK
@subsection I/O Callback Example GDK
@cindex GDK, using @acronym{GPGME} with

```

The I/O callback interface can also be used to integrate @acronym{GPGME} with the GDK event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GDK specific setup.

It is very similar to the GTK+ example in the previous section.

```

@example
#include <gdk/gdk.h>

struct my_gpgme_io_cb
@{
    gpgme_io_cb_t fnc;
    void *fnc_data;
    gint tag;
@};

```

```

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
@{
    struct my_gpgme_io_cb *iocb = data;
    (*(iocb->fnc)) (iocb->data, source);
@}

void
my_gpgme_remove_io_cb (void *data)
@{
    struct my_gpgme_io_cb *iocb = data;
    gdk_input_remove (data->tag);
@}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
@{
    struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
    iocb->fnc = fnc;
    iocb->data = fnc_data;
    iocb->tag = gtk_input_add_full (fd, dir ? GDK_INPUT_READ : GDK_INPUT_WRITE,
                                   my_gpgme_io_callback, iocb, NULL);
    *tag = iocb;
    return 0;
@}
@end example

```

```

@node I/O Callback Example Qt
@subsection I/O Callback Example Qt
@cindex Qt, using @acronym{GPGME} with

```

The I/O callback interface can also be used to integrate @acronym{GPGME} with the Qt event loop. The following code snippets show how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any Qt specific setup.

```

@example
#include <qsocketnotifier.h>
#include <qapplication.h>

struct IOCB @ {
    IOCB( GpgmeIOCb f, void * d, QSocketNotifier * n )
        : func( f ), data( d ), notifier( n ) @ { @ }

```

```

GpgmeIOCb func;
void * data;
QSocketNotifier * notifier;
@}

class MyApp : public QApplication @{

// ...

static void registerGpgmeIOCallback( void * data, int fd, int dir,
                                     GpgmeIOCb func, void * func_data,
                                     void ** tag ) @{
    QSocketNotifier * n =
        new QSocketNotifier( fd, dir ? QSocketNotifier::Read
                             : QSocketNotifier::Write );
    connect( n, SIGNAL(activated(int)),
            qApp, SLOT(slotGpgmeIOCallback(int)) );
    qApp->mIOCBs.push_back( IOCB( func, func_data, n ) );
    *tag = (void*)n;
@}

static void removeGpgmeIOCallback( void * tag ) @{
    if ( !tag ) return;
    QSocketNotifier * n = static_cast<QSocketNotifier*>( tag );
    for ( QValueList<IOCB>::iterator it = qApp->mIOCBs.begin() ;
          it != qApp->mIOCBs.end() ; ++it )
        if ( it->notifier == n ) @{
            delete it->notifier;
            qApp->mIOCBs.erase( it );
            return;
        }
@}

public slots:
void slotGpgmeIOCallback( int fd ) @{
    for ( QValueList<IOCB>::const_iterator it = mIOCBs.begin() ;
          it != mIOCBs.end() ; ++it )
        if ( it->notifier && it->notifier->socket() == fd )
            (*(it->func))( it->func_data, fd );
@}

// ...

private:
QValueList<IOCB> mIOCBs;
// ...
@};
@end example

```

@node Cancellation  
@subsection Cancellation  
@cindex cryptographic operation, aborting  
@cindex cryptographic operation, cancelling  
@cindex aborting operations  
@cindex cancelling operations

Sometimes you do not want to wait for an operation to finish.

@acronym{GPGME} provides two different functions to achieve that. The function @code{gpgme\_cancel} takes effect immediately. When it returns, the operation is effectively canceled. However, it has some limitations and can not be used with synchronous operations. In contrast, the function @code{gpgme\_cancel\_async} can be used with any context and from any thread, but it is not guaranteed to take effect immediately. Instead, cancellation occurs at the next possible time (typically the next time I/O occurs in the target context).

```
@deftypefun gpgme_ctx_t gpgme_cancel (@w{gpgme_ctx_t @var{ctx}})
@since{0.4.5}
```

The function @code{gpgme\_cancel} attempts to cancel a pending operation in the context @var{ctx}. This only works if you use the global event loop or your own event loop.

If you use the global event loop, you must not call @code{gpgme\_wait} during cancellation. After successful cancellation, you can call @code{gpgme\_wait} (optionally waiting on @var{ctx}), and the context @var{ctx} will appear as if it had finished with the error code @code{GPG\_ERR\_CANCEL}.

If you use an external event loop, you must ensure that no I/O callbacks are invoked for this context (for example by halting the event loop). On successful cancellation, all registered I/O callbacks for this context will be unregistered, and a @code{GPGME\_EVENT\_DONE} event with the error code @code{GPG\_ERR\_CANCEL} will be signalled.

The function returns an error code if the cancellation failed (in this case the state of @var{ctx} is not modified).

```
@end deftypefun
```

```
@deftypefun gpgme_ctx_t gpgme_cancel_async (@w{gpgme_ctx_t @var{ctx}})
@since{1.1.7}
```

The function @code{gpgme\_cancel\_async} attempts to cancel a pending operation in the context @var{ctx}. This can be called by any thread

at any time after starting an operation on the context, but will not take effect immediately. The actual cancellation happens at the next time GPGME processes I/O in that context.

The function returns an error code if the cancellation failed (in this case the state of @var{ctx} is not modified).

@end deftypefun

@c \*\*\*\*\*

@c \*\*\*\*\* Appendices \*\*\*\*\*

@c \*\*\*\*\*

@include uiserver.texi

@node Debugging

@appendix How to solve problems

@cindex debug

@cindex GPGME\_DEBUG

Everyone knows that software often does not do what it should do and thus there is a need to track down problems. This is in particular true for applications using a complex library like @acronym{GPGME} and of course also for the library itself. Here we give a few hints on how to solve such problems.

First of all you should make sure that the keys you want to use are installed in the GnuPG engine and are usable. Thus the first test is to run the desired operation using @command{gpg} or @command{gpgsm} on the command line. If you can't figure out why things don't work, you may use @acronym{GPGME}'s built in trace feature. This feature is either enabled using the environment variable @code{GPGME\_DEBUG} or, if this is not possible, by calling the function @code{gpgme\_set\_global\_flag}. The value is the trace level and an optional file name. If no file name is given the trace output is printed to @code{stderr}.

@noindent

For example

@smallexample

```
GPGME_DEBUG=9:/home/user/mygpgme.log
```

@end smallexample

@noindent

(Note that under Windows you use a semicolon in place of the colon to separate the fields.)

A trace level of 9 is pretty verbose and thus you may want to start off with a lower level. The exact definition of the trace levels and the output format may change with any release; you need to check the

source code for details. In any case the trace log should be helpful to understand what is going on. Warning: The trace log may reveal sensitive details like passphrases or other data you use in your application. If you are asked to send a log file, make sure that you run your tests only with play data.

@node Deprecated Functions

@appendix Deprecated Functions

@cindex deprecated

For backward compatibility @acronym{GPGME} has a number of functions, data types and constants which are deprecated and should not be used anymore. We document here those which are really old to help understanding old code and to allow migration to their modern counterparts.

@strong{Warning:} These interfaces will be removed in a future version of @acronym{GPGME}.

@deftypefun void gpgme\_key\_release (@w{gpgme\_key\_t @var{key}})

The function @code{gpgme\_key\_release} is equivalent to

@code{gpgme\_key\_unref}.

@end deftypefun

@deftypefun void gpgme\_trust\_item\_release (@w{gpgme\_trust\_item\_t @var{item}})

The function @code{gpgme\_trust\_item\_release} is an alias for

@code{gpgme\_trust\_item\_unref}.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_import\_ext (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t

@var{keydata}}, @w{int \*@var{nr}})

@since{0.3.9}

The function @code{gpgme\_op\_import\_ext} is equivalent to:

@example

```
gpgme_error_t err = gpgme_op_import (ctx, keydata);
```

```
if (!err)
```

```
  @ {
```

```
    gpgme_import_result_t result = gpgme_op_import_result (ctx);
```

```
    *nr = result->considered;
```

```
  @ }
```

@end example

@end deftypefun

```
@deftp {Data type} {gpgme_error_t (*gpgme_edit_cb_t) @
(@w{void *@var{handle}}, @
@w{gpgme_status_code_t @var{status}}, @
@w{const char *@var{args}}, @
@w{int @var{fd}})}
@tindex gpgme_edit_cb_t
```

The `gpgme_edit_cb_t` type is the type of functions which `GPGME` calls if it a key edit operation is on-going. The status code `@var{status}` and the argument line `@var{args}` are passed through by `GPGME` from the crypto engine. The file descriptor `@var{fd}` is -1 for normal status messages. If `@var{status}` indicates a command rather than a status message, the response to the command should be written to `@var{fd}`. The `@var{handle}` is provided by the user at start of operation.

The function should return `GPG_ERR_FALSE` if it did not handle the status code, `0` for success, or any other error value.

```
@end deftp
```

```
@deftypefun gpgme_error_t gpgme_op_edit (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{key}},
@w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
@since{0.3.9}
```

Note: This function is deprecated, please use

```
gpgme_op_interact instead.
```

The function `gpgme_op_edit` processes the key `@var{KEY}` interactively, using the edit callback function `@var{FNC}` with the handle `@var{HANDLE}`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `@var{out}`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by `GPGME`.

The function returns the error code `GPG_ERR_NO_ERROR` if the edit operation completes successfully, `GPG_ERR_INV_VALUE` if `@var{ctx}` or `@var{key}` is not a valid pointer, and any error returned by the crypto engine or the edit callback handler.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_edit_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
@since{0.3.9}
```

Note: This function is deprecated, please use

`gpgme_op_interact_start` instead.

The function `gpgme_op_edit_start` initiates a `gpgme_op_edit` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `ctx` or `key` is not a valid pointer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_card_edit (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void * @var{handle}}, @w{gpgme_data_t @var{out}})
```

Note: This function is deprecated, please use `gpgme_op_interact` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit` is analogous to `gpgme_op_edit`, but should be used to process the smart card corresponding to the key `key`.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_card_edit_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void * @var{handle}}, @w{gpgme_data_t @var{out}})
```

Note: This function is deprecated, please use `gpgme_op_interact_start` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit_start` initiates a `gpgme_op_card_edit` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `ctx` or `key` is not a valid pointer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_data_new_with_read_cb (@w{gpgme_data_t * @var{dh}}, @w{int (* @var{readfunc})} (@w{void * @var{hook}}, @w{char * @var{buffer}}, @w{size_t @var{count}}, @w{size_t * @var{nread}}), @w{void * @var{hook_value}})
```

The function `gpgme_data_new_with_read_cb` creates a new `gpgme_data_t` object and uses the callback function `readfunc` to retrieve the data on demand. As the callback function can supply the data in any way it wants, this is the most flexible data type `gpgme` provides. However, it can not be used to write data.

The callback function receives `hook_value` as its first argument whenever it is invoked. It should return up to `count` bytes in

@var{buffer}, and return the number of bytes actually read in @var{nread}. It may return @code{0} in @var{nread} if no data is currently available. To indicate @code{EOF} the function should return with an error code of @code{-1} and set @var{nread} to @code{0}. The callback function may support to reset its internal read pointer if it is invoked with @var{buffer} and @var{nread} being @code{NULL} and @var{count} being @code{0}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the data object was successfully created, @code{GPG\_ERR\_INV\_VALUE} if @var{dh} or @var{readfunc} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if not enough memory is available.  
@end dectypedefun

@deftypedefun gpgme\_error\_t gpgme\_data\_rewind (@w{gpgme\_data\_t @var{dh}})

The function @code{gpgme\_data\_rewind} is equivalent to:

@example

```
return (gpgme_data_seek (dh, 0, SEEK_SET) == -1)
    ? gpgme_error_from_errno (errno) : 0;
```

@end example

@end dectypedefun

@deftp {Data type} gpgme\_attr\_t

The @code{gpgme\_attr\_t} type is used to specify a key or trust item attribute. The following attributes are defined:

@table @code

@item GPGME\_ATTR\_KEYID

This is the key ID of a sub key. It is representable as a string.

For trust items, the trust item refers to the key with this ID.

@item GPGME\_ATTR\_FPR

This is the fingerprint of a sub key. It is representable as a string.

@item GPGME\_ATTR\_ALGO

This is the crypto algorithm for which the sub key can be used. It is representable as a string and as a number. The numbers correspond to the @code{enum gcry\_pk\_algos} values in the gcrypt library.

@item GPGME\_ATTR\_LEN

This is the key length of a sub key. It is representable as a number.

@item GPGME\_ATTR\_CREATED

This is the timestamp at creation time of a sub key. It is representable as a number.

@item GPGME\_ATTR\_EXPIRE

This is the expiration time of a sub key. It is representable as a number.

@item GPGME\_ATTR\_OTRUST

XXX FIXME (also for trust items)

@item GPGME\_ATTR\_USERID

This is a user ID. There can be more than one user IDs in a @var{gpgme\_key\_t} object. The first one (with index 0) is the primary user ID. The user ID is representable as a number.

For trust items, this is the user ID associated with this trust item.

@item GPGME\_ATTR\_NAME

This is the name belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_EMAIL

This is the email address belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_COMMENT

This is the comment belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_VALIDITY

This is the validity belonging to a user ID. It is representable as a string and as a number. See below for a list of available validities.

For trust items, this is the validity that is associated with this trust item.

@item GPGME\_ATTR\_UID\_REVOKED

This specifies if a user ID is revoked. It is representable as a number, and is @code{1} if the user ID is revoked, and @code{0} otherwise.

@item GPGME\_ATTR\_UID\_INVALID

This specifies if a user ID is invalid. It is representable as a number, and is @code{1} if the user ID is invalid, and @code{0} otherwise.

@item GPGME\_ATTR\_LEVEL

This is the trust level of a trust item.

@item GPGME\_ATTR\_TYPE

This returns information about the type of key. For the string function this will either be "PGP" or "X.509". The integer function returns 0 for PGP and 1 for X.509. It is also used for the type of a trust item.

@item GPGME\_ATTR\_IS\_SECRET

This specifies if the key is a secret key. It is representable as a number, and is @code{1} if the key is revoked, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_REVOKED

This specifies if a sub key is revoked. It is representable as a number, and is @code{1} if the key is revoked, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_INVALID

This specifies if a sub key is invalid. It is representable as a number, and is @code{1} if the key is invalid, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_EXPIRED

This specifies if a sub key is expired. It is representable as a number, and is @code{1} if the key is expired, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_DISABLED

This specifies if a sub key is disabled. It is representable as a number, and is @code{1} if the key is disabled, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_CAPS

This is a description of the capabilities of a sub key. It is representable as a string. The string contains the letter ``e" if the key can be used for encryption, ``s" if the key can be used for signatures, and ``c" if the key can be used for certifications.

@item GPGME\_ATTR\_CAN\_ENCRYPT

This specifies if a sub key can be used for encryption. It is representable as a number, and is @code{1} if the sub key can be used for encryption, and @code{0} otherwise.

@item GPGME\_ATTR\_CAN\_SIGN

This specifies if a sub key can be used to create data signatures. It is representable as a number, and is @code{1} if the sub key can be used for signatures, and @code{0} otherwise.

@item GPGME\_ATTR\_CAN\_CERTIFY

This specifies if a sub key can be used to create key certificates. It is representable as a number, and is @code{1} if the sub key can be used for certifications, and @code{0} otherwise.

@item GPGME\_ATTR\_SERIAL

The X.509 issuer serial attribute of the key. It is representable as

a string.

@item GPGME\_ATTR\_ISSUE

The X.509 issuer name attribute of the key. It is representable as a string.

@item GPGME\_ATTR\_CHAINID

The X.509 chain ID can be used to build the certification chain. It is representable as a string.

@end table

@end deftp

```
@deftypefun {const char *} gpgme_key_get_string_attr (@w{gpgme_key_t @var{key}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_key_get_string_attr` returns the value of the string-representable attribute `@var{what}` of key `@var{key}`. If the attribute is an attribute of a sub key or an user ID, `@var{idx}` specifies the sub key or user ID of which the attribute value is returned. The argument `@var{reserved}` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns `0` if an attribute can't be returned as a string, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

@end deftypefun

```
@deftypefun {unsigned long} gpgme_key_get_ulong_attr (@w{gpgme_key_t @var{key}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_key_get_ulong_attr` returns the value of the number-representable attribute `@var{what}` of key `@var{key}`. If the attribute is an attribute of a sub key or an user ID, `@var{idx}` specifies the sub key or user ID of which the attribute value is returned. The argument `@var{reserved}` is reserved for later use and should be `NULL`.

The function returns `0` if the attribute can't be returned as a number, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

@end deftypefun

@c

@c Key Signatures

@c

The signatures on a key are only available if the key was retrieved via a listing operation with the `GPGME_KEYLIST_MODE_SIGS` mode

enabled, because it is expensive to retrieve all signatures of a key.

So, before using the below interfaces to retrieve the signatures on a key, you have to make sure that the key was listed with signatures enabled. One convenient, but blocking, way to do this is to use the function `gpgme_get_key`.

`@defn {Data type} gpgme_attr_t`

The `gpgme_attr_t` type is used to specify a key signature attribute. The following attributes are defined:

`@table @code`

`@item GPGME_ATTR_KEYID`

This is the key ID of the key which was used for the signature. It is representable as a string.

`@item GPGME_ATTR_ALGO`

This is the crypto algorithm used to create the signature. It is representable as a string and as a number. The numbers correspond to the `enum gcry_pk_algos` values in the `gcrypt` library.

`@item GPGME_ATTR_CREATED`

This is the timestamp at creation time of the signature. It is representable as a number.

`@item GPGME_ATTR_EXPIRE`

This is the expiration time of the signature. It is representable as a number.

`@item GPGME_ATTR_USERID`

This is the user ID associated with the signing key. The user ID is representable as a number.

`@item GPGME_ATTR_NAME`

This is the name belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_EMAIL`

This is the email address belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_COMMENT`

This is the comment belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_KEY_REVOKED`

This specifies if a key signature is a revocation signature. It is representable as a number, and is `1` if the key is revoked, and `0` otherwise.

@c @item GPGME\_ATTR\_KEY\_EXPIRED

@c This specifies if a key signature is expired. It is representable as  
@c a number, and is @code{1} if the key is revoked, and @code{0}  
@c otherwise.

@c

@item GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is  
representable as a number. The meaning is specific to the crypto  
engine.

@item GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is  
representable as a number. The meaning is specific to the crypto  
engine.

@item GPGME\_ATTR\_SIG\_STATUS

This is the same value as returned by @code{gpgme\_get\_sig\_status}.

@end table

@end deftp

@deftypefun {const char \*} gpgme\_key\_sig\_get\_string\_attr (@w{gpgme\_key\_t @var{key}}, @w{int  
@var{uid\_idx}}, @w{gpgme\_attr\_t @var{what}}, @w{const void \*@var{reserved}}, @w{int @var{idx}})

The function @code{gpgme\_key\_sig\_get\_string\_attr} returns the value of  
the string-representable attribute @var{what} of the signature  
@var{idx} on the user ID @var{uid\_idx} in the key @var{key}. The  
argument @var{reserved} is reserved for later use and should be  
@code{NULL}.

The string returned is only valid as long as the key is valid.

The function returns @code{0} if an attribute can't be returned as a  
string, @var{key} is not a valid pointer, @var{uid\_idx} or @var{idx}  
out of range, or @var{reserved} not @code{NULL}.

@end deftypefun

@deftypefun {unsigned long} gpgme\_key\_sig\_get\_ulong\_attr (@w{gpgme\_key\_t @var{key}}, @w{int  
@var{uid\_idx}}, @w{gpgme\_attr\_t @var{what}}, @w{const void \*@var{reserved}}, @w{int @var{idx}})

The function @code{gpgme\_key\_sig\_get\_ulong\_attr} returns the value of  
the number-representable attribute @var{what} of the signature  
@var{idx} on the user ID @var{uid\_idx} in the key @var{key}. The  
argument @var{reserved} is reserved for later use and should be  
@code{NULL}.

The function returns @code{0} if an attribute can't be returned as a  
string, @var{key} is not a valid pointer, @var{uid\_idx} or @var{idx}  
out of range, or @var{reserved} not @code{NULL}.

@end deftypefun

@c node Information About Trust Items  
@c subsection Information About Trust Items  
@c cindex trust item, information about  
@c cindex trust item, attributes  
@c cindex attributes, of a trust item

Trust items have attributes which can be queried using the interfaces below. The attribute identifiers are shared with those for key attributes. @xref{Information About Keys}.

```
@deftypefun {const char *} gpgme_trust_item_get_string_attr (@w{gpgme_trust_item_t @var{item}},  
@w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function @code{gpgme\_trust\_item\_get\_string\_attr} returns the value of the string-representable attribute @var{what} of trust item @var{item}. The arguments @var{idx} and @var{reserved} are reserved for later use and should be @code{0} and @code{NULL} respectively.

The string returned is only valid as long as the key is valid.

The function returns @code{0} if an attribute can't be returned as a string, @var{key} is not a valid pointer, @var{idx} out of range, or @var{reserved} not @code{NULL}.

```
@end deftypefun
```

```
@deftypefun int gpgme_trust_item_get_int_attr (@w{gpgme_trust_item_t @var{item}}, @w{gpgme_attr_t  
@var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function @code{gpgme\_trust\_item\_get\_int\_attr} returns the value of the number-representable attribute @var{what} of trust item @var{item}. If the attribute occurs more than once in the trust item, the index is specified by @var{idx}. However, currently no such attribute exists, so @var{idx} should be @code{0}. The argument @var{reserved} is reserved for later use and should be @code{NULL}.

The function returns @code{0} if the attribute can't be returned as a number, @var{key} is not a valid pointer, @var{idx} out of range, or @var{reserved} not @code{NULL}.

```
@end deftypefun
```

```
@defftp {Data type} {enum gpgme_sig_stat_t}
```

```
@tindex gpgme_sig_stat_t
```

The @code{gpgme\_sig\_stat\_t} type holds the result of a signature check, or the combined result of all signatures. The following results are possible:

```
@table @code
```

@item GPGME\_SIG\_STAT\_NONE

This status should not occur in normal operation.

@item GPGME\_SIG\_STAT\_GOOD

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

@item GPGME\_SIG\_STAT\_GOOD\_EXP

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

@item GPGME\_SIG\_STAT\_GOOD\_EXPKEY

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

@item GPGME\_SIG\_STAT\_BAD

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

@item GPGME\_SIG\_STAT\_NOKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

@item GPGME\_SIG\_STAT\_NOSIG

This status indicates that the signature data provided was not a real signature.

@item GPGME\_SIG\_STAT\_ERROR

This status indicates that there was some other error which prevented the signature verification.

@item GPGME\_SIG\_STAT\_DIFF

For the combined result this status means that at least two signatures have a different status. You can get each key's status with

@code{gpgme\_get\_sig\_status}.

@end table

@end deftp

@deftypedefun {const char \*} gpgme\_get\_sig\_status (@w{gpgme\_ctx\_t @var{ctx}}, @w{int @var{idx}}, @w{gpgme\_sig\_stat\_t \*@var{r\_stat}}, @w{time\_t \*@var{r\_created}})

The function @code{gpgme\_get\_sig\_status} is equivalent to:

@example

```
gpgme_verify_result_t result;
```

```
gpgme_signature_t sig;
```

```

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
  @ {
    sig = sig->next;
    idx--;
  @ }
if (!sig || idx)
  return NULL;

if (r_stat)
  @ {
    switch (gpg_err_code (sig->status))
    @ {
case GPG_ERR_NO_ERROR:
  *r_stat = GPGME_SIG_STAT_GOOD;
  break;

case GPG_ERR_BAD_SIGNATURE:
  *r_stat = GPGME_SIG_STAT_BAD;
  break;

case GPG_ERR_NO_PUBKEY:
  *r_stat = GPGME_SIG_STAT_NOKEY;
  break;

case GPG_ERR_NO_DATA:
  *r_stat = GPGME_SIG_STAT_NOSIG;
  break;

case GPG_ERR_SIG_EXPIRED:
  *r_stat = GPGME_SIG_STAT_GOOD_EXP;
  break;

case GPG_ERR_KEY_EXPIRED:
  *r_stat = GPGME_SIG_STAT_GOOD_EXPKEY;
  break;

default:
  *r_stat = GPGME_SIG_STAT_ERROR;
  break;
    @ }
  @ }
if (r_created)
  *r_created = sig->timestamp;
return sig->fpr;

```

```
@end example
@end deftypefun
```

```
@deftypefun {const char *} gpgme_get_sig_string_attr (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_attr_t @var{what}}, @w{int @var{whatidx}})
```

The function `gpgme_get_sig_string_attr` is equivalent to:

```
@example
```

```
gpgme_verify_result_t result;
gpgme_signature_t sig;
```

```
result = gpgme_op_verify_result (ctx);
sig = result->signatures;
```

```
while (sig && idx)
```

```
  @ {
    sig = sig->next;
    idx--;
  @ }
```

```
if (!sig || idx)
  return NULL;
```

```
switch (what)
```

```
  @ {
  case GPGME_ATTR_FPR:
    return sig->fpr;
```

```
  case GPGME_ATTR_ERRTOK:
```

```
    if (whatidx == 1)
      return sig->wrong_key_usage ? "Wrong_Key_Usage" : "";
    else
```

```
  return "";
```

```
  default:
```

```
    break;
```

```
  @ }
```

```
return NULL;
```

```
@end example
@end deftypefun
```

```
@deftypefun {const char *} gpgme_get_sig_ulong_attr (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_attr_t @var{what}}, @w{int @var{whatidx}})
```

The function `gpgme_get_sig_ulong_attr` is equivalent to:

```
@example
```

```
gpgme_verify_result_t result;
gpgme_signature_t sig;
```

```

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
  @ {
    sig = sig->next;
    idx--;
  }
if (!sig || idx)
  return 0;

switch (what)
  @ {
case GPGME_ATTR_CREATED:
  return sig->timestamp;

case GPGME_ATTR_EXPIRE:
  return sig->exp_timestamp;

case GPGME_ATTR_VALIDITY:
  return (unsigned long) sig->validity;

case GPGME_ATTR_SIG_STATUS:
  switch (sig->status)
    @ {
case GPG_ERR_NO_ERROR:
  return GPGME_SIG_STAT_GOOD;

case GPG_ERR_BAD_SIGNATURE:
  return GPGME_SIG_STAT_BAD;

case GPG_ERR_NO_PUBKEY:
  return GPGME_SIG_STAT_NOKEY;

case GPG_ERR_NO_DATA:
  return GPGME_SIG_STAT_NOSIG;

case GPG_ERR_SIG_EXPIRED:
  return GPGME_SIG_STAT_GOOD_EXP;

case GPG_ERR_KEY_EXPIRED:
  return GPGME_SIG_STAT_GOOD_EXPKEY;

default:
  return GPGME_SIG_STAT_ERROR;
    }

case GPGME_ATTR_SIG_SUMMARY:

```

```

return sig->summary;

default:
    break;
@}
return 0;
@end example
@end deftypefun

@deftypefun {const char *} gpgme_get_sig_key (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_key_t *@var{r_key}})
The function @code{gpgme_get_sig_key} is equivalent to:

@example
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
@{
    sig = sig->next;
    idx--;
@}
if (!sig || idx)
    return gpg_error (GPG_ERR_EOF);

return gpgme_get_key (ctx, sig->fpr, r_key, 0);
@end example
@end deftypefun

@include lesser.texi

@include gpl.texi

@node Concept Index
@unnumbered Concept Index

@printindex cp

@node Function and Data Index
@unnumbered Function and Data Index

```

@printindex fn

@bye

(21:protected-private-key(3:elg(1:p129:|B36I(s7}+ZJ/pvE;"tg7N ca"Gxvnyu&bB#h'7=89&oG  
R<hO)(1:g1:)(1:y128:Ji]WU\_UP}AQ\YMhAl|2e{ \_tcMNDg){ QnWsK 4pY { \$bDCs)(9:protected25:openpgp-s2k3-  
sha1-aes-cbc((4:sha18:JcE7:6452224)16: i[Q\*vK)192:FJA!O!ZAF

biJ&Tsb!t

&9@R\~V+x>?sedDz-W(yqf?u^e?s1saV8<T0:tC5%ZMh?\$,y\_e[1D)(12:protected-at15:20130812T105135)))

(private-key

(oid.1.2.840.113549.1.1.1

(n

#00e0ce96f90b6c9e02f3922beada93fe50a875eac6bcc18bb9a9cf2e84965caa2d1ff95a7f542465c6c0c19d276e4526ce  
048868a7a914fd343cc3a87dd74291ffc565506d5bbb25cbac6a0e2dd1f8bcaab0d4a29c2f37c950f363484bf269f78914  
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(e #010001#)

(d

#046129F2489D71579BE0A75FE029BD6CDB574EBF57EA8A5B0FDA942CAB943B117D7BB95E5D28875E0F  
9FC5FCC06A72F6D502464DABDED78EF6B716177B83D5BDC543DC5D3FED932E59F5897E92E6F58A0F334  
24106A3B6FA2CBF877510E4AC21C3EE47851E97D12996222AC3566D4CCB0B83D164074ABF7DE655FC244  
6DA1781#)

(p

#00e861b700e17e8afe6837e7512e35b6ca11d0ae47d8b85161c67baf64377213fe52d772f2035b3ca830af41d8a4120e  
1c1c70d12cc22f00d28d31dd48a8d424f1#)

(q

#00f7a7ca5367c661f8e62df34f0d05c10c88e5492348dd7bdbc942c9a8f369f935a07785d2db805215ed786e4285df16  
58eed3ce84f469b81b50d358407b4ad361#)

(u

#304559a9ead56d2309d203811a641bb1a09626bc8eb36ffa23c968ec5bd891eebbafc73ae666e01ba7c8990bae06cc2  
bbe10b75e69fcacb353a6473079d8e9b#)

)

)

# libpgme.vers - List of symbols to export.

# Copyright (C) 2002, 2004, 2005, 2009, 2012 g10 Code GmbH

#

# This file is part of GPGME.

#

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#

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#

# You should have received a copy of the GNU Lesser General Public

# License along with this program; if not, see <<https://www.gnu.org/licenses/>>.

#-----

# Please remember to add new functions also to gpgme.def

#-----

GPGME\_1.1 {

global:

gpgme\_set\_engine\_info;

gpgme\_ctx\_get\_engine\_info;

gpgme\_ctx\_set\_engine\_info;

gpgme\_data\_set\_file\_name;

gpgme\_data\_get\_file\_name;

gpgme\_data\_identify;

gpgme\_sig\_notation\_clear;

gpgme\_sig\_notation\_add;

gpgme\_sig\_notation\_get;

gpgme\_free;

gpgme\_op\_getauditlog\_start;

gpgme\_op\_getauditlog;

gpgme\_conf\_release;

gpgme\_conf\_arg\_new;

gpgme\_conf\_arg\_release;

gpgme\_conf\_opt\_change;

gpgme\_op\_conf\_load;

gpgme\_op\_conf\_save;

gpgme\_op\_conf\_dir;

gpgme\_cancel\_async;

gpgme\_op\_assuan\_result;

gpgme\_op\_assuan\_transact;

gpgme\_op\_assuan\_transact\_start;

gpgme\_check\_version\_internal;

gpgme\_io\_read;

gpgme\_io\_write;

gpgme\_result\_ref;

gpgme\_result\_unref;

gpgme\_op\_import\_keys;  
gpgme\_op\_import\_keys\_start;  
gpgme\_op\_export\_keys;  
gpgme\_op\_export\_keys\_start;

gpgme\_op\_assuan\_transact\_ext;

gpgme\_wait\_ext;

gpgme\_op\_vfs\_mount\_result;  
gpgme\_op\_vfs\_mount;  
gpgme\_op\_vfs\_create;

gpgme\_key\_from\_uid;  
gpgme\_set\_sub\_protocol;  
gpgme\_get\_sub\_protocol;

gpgme\_op\_passwd\_start;  
gpgme\_op\_passwd;

gpgme\_set\_global\_flag;

gpgme\_io\_writen;

gpgme\_set\_pinentry\_mode;  
gpgme\_get\_pinentry\_mode;

gpgme\_get\_dirinfo;

gpgme\_op\_spawn\_start;  
gpgme\_op\_spawn;

gpgme\_set\_offline;  
gpgme\_get\_offline;

gpgme\_set\_status\_cb;  
gpgme\_get\_status\_cb;

gpgme\_pubkey\_algo\_string;  
gpgme\_set\_ctx\_flag;  
gpgme\_get\_ctx\_flag;  
gpgme\_data\_set\_flag;

gpgme\_op\_createkey\_start;  
gpgme\_op\_createkey;  
gpgme\_op\_createsubkey\_start;  
gpgme\_op\_createsubkey;  
gpgme\_op\_adduid\_start;

```
gpgme_op_adduid;
gpgme_op_revuid_start;
gpgme_op_revuid;
gpgme_op_keysign_start;
gpgme_op_keysign;
gpgme_op_tofu_policy_start;
gpgme_op_tofu_policy;
gpgme_op_interact_start;
gpgme_op_interact;

gpgme_addrspec_from_uid;

gpgme_set_sender;
gpgme_get_sender;

gpgme_op_query_swdb;
gpgme_op_query_swdb_result;

gpgme_op_set_uid_flag_start;
gpgme_op_set_uid_flag;

gpgme_op_decrypt_ext;
gpgme_op_decrypt_ext_start;

gpgme_data_new_from_estream;

};
```

```
GPGME_1.0 {
global:
    gpgme_check_version;
    gpgme_get_engine_info;
    gpgme_engine_check_version;

    gpgme_err_code_from_errno;
    gpgme_err_code_to_errno;
    gpgme_err_make_from_errno;
    gpgme_error_from_errno;
    gpgme_strerror;
    gpgme_strerror_r;
    gpgme_strsource;

    gpgme_data_get_encoding;
    gpgme_data_new;
    gpgme_data_new_from_cbs;
    gpgme_data_new_from_fd;
    gpgme_data_new_from_file;
```

gpgme\_data\_new\_from\_filepart;  
gpgme\_data\_new\_from\_mem;  
gpgme\_data\_new\_from\_stream;  
gpgme\_data\_read;  
gpgme\_data\_release;  
gpgme\_data\_release\_and\_get\_mem;  
gpgme\_data\_seek;  
gpgme\_data\_set\_encoding;  
gpgme\_data\_write;

gpgme\_get\_protocol\_name;  
gpgme\_hash\_algo\_name;  
gpgme\_pubkey\_algo\_name;

gpgme\_new;  
gpgme\_get\_armor;  
gpgme\_get\_include\_certs;  
gpgme\_get\_io\_cbs;  
gpgme\_get\_keylist\_mode;  
gpgme\_get\_passphrase\_cb;  
gpgme\_get\_progress\_cb;  
gpgme\_get\_protocol;  
gpgme\_get\_textmode;  
gpgme\_release;  
gpgme\_set\_armor;  
gpgme\_set\_include\_certs;  
gpgme\_set\_io\_cbs;  
gpgme\_set\_keylist\_mode;  
gpgme\_set\_locale;  
gpgme\_set\_passphrase\_cb;  
gpgme\_set\_progress\_cb;  
gpgme\_set\_protocol;  
gpgme\_set\_textmode;  
gpgme\_signers\_add;  
gpgme\_signers\_clear;  
gpgme\_signers\_count;  
gpgme\_signers\_enum;

gpgme\_key\_ref;  
gpgme\_key\_unref;  
gpgme\_key\_release;

gpgme\_trust\_item\_ref;  
gpgme\_trust\_item\_unref;

gpgme\_cancel;  
gpgme\_op\_card\_edit;  
gpgme\_op\_card\_edit\_start;

gpgme\_op\_decrypt;  
gpgme\_op\_decrypt\_result;  
gpgme\_op\_decrypt\_start;  
gpgme\_op\_decrypt\_verify;  
gpgme\_op\_decrypt\_verify\_start;  
gpgme\_op\_delete;  
gpgme\_op\_delete\_start;  
gpgme\_op\_delete\_ext;  
gpgme\_op\_delete\_ext\_start;  
gpgme\_op\_edit;  
gpgme\_op\_edit\_start;  
gpgme\_op\_encrypt;  
gpgme\_op\_encrypt\_start;  
gpgme\_op\_encrypt\_ext;  
gpgme\_op\_encrypt\_ext\_start;  
gpgme\_op\_encrypt\_sign;  
gpgme\_op\_encrypt\_sign\_ext;  
gpgme\_op\_encrypt\_sign\_start;  
gpgme\_op\_encrypt\_sign\_ext\_start;  
gpgme\_op\_encrypt\_result;

gpgme\_op\_export;  
gpgme\_op\_export\_ext;  
gpgme\_op\_export\_ext\_start;  
gpgme\_op\_export\_start;  
gpgme\_op\_genkey;  
gpgme\_op\_genkey\_result;  
gpgme\_op\_genkey\_start;  
gpgme\_get\_key;  
gpgme\_op\_import;  
gpgme\_op\_import\_result;  
gpgme\_op\_import\_start;  
gpgme\_op\_keylist\_end;  
gpgme\_op\_keylist\_ext\_start;  
gpgme\_op\_keylist\_from\_data\_start;  
gpgme\_op\_keylist\_next;  
gpgme\_op\_keylist\_result;  
gpgme\_op\_keylist\_start;  
gpgme\_op\_sign;  
gpgme\_op\_sign\_result;  
gpgme\_op\_sign\_start;  
gpgme\_op\_trustlist\_end;  
gpgme\_op\_trustlist\_next;  
gpgme\_op\_trustlist\_start;  
gpgme\_op\_verify;  
gpgme\_op\_verify\_result;  
gpgme\_op\_verify\_start;  
gpgme\_wait;

```
gpgme_data_new_with_read_cb;
gpgme_data_rewind;
gpgme_get_sig_status;
gpgme_get_sig_string_attr;
gpgme_get_sig_ulong_attr;
gpgme_get_sig_key;
gpgme_key_get_string_attr;
gpgme_key_get_ulong_attr;
gpgme_key_sig_get_string_attr;
gpgme_key_sig_get_ulong_attr;
gpgme_op_import_ext;
gpgme_trust_item_get_int_attr;
gpgme_trust_item_get_string_attr;
gpgme_trust_item_release;

gpgme_err_code_from_syserror;
gpgme_err_set_errno;
```

local:

```
*,
```

```
};
```

```
#+TITLE: Stuff To Do
```

```
#+LATEX_COMPILER: xelatex
```

```
#+LATEX_CLASS: article
```

```
#+LATEX_CLASS_OPTIONS: [12pt]
```

```
#+LATEX_HEADER: \usepackage{xltextra}
```

```
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
```

```
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Latin Modern Roman}
```

```
* Project Task List
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: task-list
```

```
:END:
```

```
** DONE Documentation default format
```

```
CLOSED: [2018-02-15 Thu 21:29]
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: todo-docs-default
```

```
:END:
```

Decide on a default file format for documentation. The two main contenders being Org Mode, the default for the GnuPG Project and reStructuredText, the default for Python projects. A third option of DITA XML was considered due to a number of beneficial features it provides.

The decision was made to use Org Mode in order to fully integrate with the rest of the GPGME and GnuPG documentation. It is possible to produce reST versions via Pandoc and DITA XML can be reached through converting to either Markdown or XHTML first.

\*\* TODO Documentation build systems

```
:PROPERTIES:
:CUSTOM_ID: todo-docs-build-systems
:END:
```

Though Org Mode is being used for the default documentation format, it still needs to end up as usable by end users. So the Org Mode files are used to produce the "source" files used by the two main contenders for documenting the bindings: Texinfo and ReStructuredText/Docutils.

\*\*\* TODO Texinfo documentation

```
:PROPERTIES:
:CUSTOM_ID: todo-docs-build-texinfo
:END:
```

Need to add all of Texinfo's ... special systems to make it do its things.

\*\*\* TODO ReStructuredText documentation

```
:PROPERTIES:
:CUSTOM_ID: todo-docs-build-docutils
:END:
```

Need to run Sphinx's quick start, add it to the requirements and tweak the index page for the rst files to point to the HOWTO and other files.

It might just be easier to do all that in Org Mode and convert the lot, then the Sphinx bits can be automated.

\*\* STARTED Documentation HOWTO

```
:PROPERTIES:
:CUSTOM_ID: todo-docs-howto
:END:
```

- State "STARTED" from "TODO" [2018-03-08 Thu 13:59] \\  
Started yesterday.

Write a HOWTO style guide for the current Python bindings.

\*\*\* DONE Start python bindings HOWTO

CLOSED: [2018-03-07 Wed 18:14]

:PROPERTIES:

:CUSTOM\_ID: howto-start

:END:

\*\*\* STARTED Include certain specific instructions in the HOWTO

:PROPERTIES:

:CUSTOM\_ID: howto-requests

:END:

Note: moved the S/MIME bits out to their own section of the TODO list and may be served better by separate HOWTO documentation anyway.

- State "STARTED" from "TODO" [2018-03-09 Fri 15:27]

Some functions can be worked out from the handful of examples available, but many more can't and I've already begun receiving requests for certain functions to be explained.

\*\*\*\* DONE Standard scenarios

CLOSED: [2018-03-19 Mon 12:34]

:PROPERTIES:

:CUSTOM\_ID: howto-the-basics

:END:

- State "DONE" from "STARTED" [2018-03-19 Mon 12:34] \\  
All four of those are done.

- State "STARTED" from "TODO" [2018-03-09 Fri 15:26] \\  
Began with the example code, now to add the text.

What everyone expects: encryption, decryption, signing and verifying.

\*\*\*\* STARTED Key control

:PROPERTIES:

:CUSTOM\_ID: howto-key-control

:END:

- State "STARTED" from "TODO" [2018-03-19 Mon 12:35] \\  
Generating keys and subkeys are done, but revocation is still to be done.

Generating keys, adding subkeys, revoking subkeys (and keeping the cert key), adding and revoking UIDs, signing/certifying keys.

\*\*\*\* DONE More key control

CLOSED: [2018-03-19 Mon 12:36]

:PROPERTIES:

:CUSTOM\_ID: howto-key-selection

:END:

- State "DONE" from "TODO" [2018-03-19 Mon 12:36] \\

Key selection, searching, matching and counting is done.

Selecting keys to encrypt to or manipulate in other ways (e.g. as with key control or the basics).

\*\* TODO Documentation SWIG

:PROPERTIES:

:CUSTOM\_ID: todo-docs-swig

:END:

Write documentation for the complete SWIG bindings demonstrating the correspondence with GPGME itself.

Note: it is likely that this will be more in the nature of something to be used in conjunction with the existing GPGME documentation which makes it easier for Python developers to use.

\*\* TODO GUI examples

:PROPERTIES:

:CUSTOM\_ID: todo-gui-examples

:END:

Create some examples of using Python bindings in a GUI application to either match or be similar to the old GTK2 examples available with PyME.

\*\* TODO Replace SWIG

:PROPERTIES:

:CUSTOM\_ID: todo-replace-swig

:END:

Selecting SWIG for this project in 2002 was understandable and effectively the only viable option. The options available now, however, are significantly improved and some of those would resolve a number of existing problems with using SWIG, particularly when running code on both POSIX compliant and Windows platforms.

The long term goal is to replace SWIG by reimplementing the Python bindings using a more suitable means of interfacing with the GPGME C source code.

\*\*\* TODO Replacement for SWIG

:PROPERTIES:  
:CUSTOM\_ID: todo-replace-swig-replacement  
:END:

Decide on a replacement for SWIG. Currently CFFI is looking like the most viable candidate, but some additional testing and checks are yet to be completed.

\*\* TODO API for an API

:PROPERTIES:  
:CUSTOM\_ID: todo-api-squared  
:END:

A C API like GPGME is not what most modern developers think of when they hear the term API. Normally they think of something they can interact with like a RESTful web API. Though RESTful is unlikely given the nature of GPGME and the process of encryption, it may be possible to provide a more familiar interface which can be utilised by developers of other languages for which bindings are not available or for which it is too difficult to create proper bindings.

\*\* TODO S/MIME

:PROPERTIES:  
:CUSTOM\_ID: s-mime  
:END:

Eventually add some of this, but the OpenPGP details are far more important at the moment.

\* Project Task Details

:PROPERTIES:  
:CUSTOM\_ID: detailed-tasks  
:END:

\*\* Working examples

:PROPERTIES:  
:CUSTOM\_ID: working-examples  
:END:

The old GUI examples were unable to be retained since they depended on GTK2 and Python 2's integration with GTK2.

Current GPGME examples so far only include command line tools or

basic Python code for use with either Python 2.7 or Python 3.4 and above.

Future GUI examples ought to utilise available GUI modules and libraries supported by Python 3. This may include Qt frameworks, Tkinter, GTK3 or something else entirely.

\*\* Documentation

:PROPERTIES:

:CUSTOM\_ID: documentation

:END:

The legacy documentation which no longer applies to the Python bindings has been removed.

Current and future documentation will adhere to the GnuPG standard of using Org Mode and not use the reStructuredText (reST) format more commonly associated with Python documentation. The reasons for this are that this project is best served as shipping with the rest of GPGME and the documentation ought to match that. There are also aspects of Org Mode's publishing features which are superior to the defaults of reST, including the capacity to generate fully validating strict XHTML output.

If reST files are required at a later point for future inclusion with other Python packages, then that format can be generated from the .org files with Pandoc before being leveraged by either Docutils, Sphinx or something else.

While there are some advanced typesetting features of reST which are not directly available to Org Mode, more often than not those features are best implemented with either HTML and CSS, with LaTeX to produce a PDF or via a number of XML solutions. Both reST and Org Mode have multiple paths by which to achieve all of these.

-----BEGIN PGP PRIVATE KEY BLOCK-----

```
IQOYBFrsKEkBCADKw4Wt8J6M/88qD8PO6lSMCxH1cpwH8iK0uPaFFYsJkkXo7kWf
PTAttrV+REqF/o80dvYcdLvRsV21pvncZz/HXLu1yQ18mC3XObrKokbdgrTTKA5XE
BZkNsqyaMMJauT18H4hYkSg62/tTdO1cu/zWv/LFf7Xyn6+uA74ovXCJIO1s0N2c
PSht98QRzPMf2owgVk37JnDNp4gGVDGHxSZOuUwXgYAZYnA8SFc+c+3ZrQfY870
+O4j3Mz4p7yD13AwP4buQLBsb/icxekeQCqpRjHLH9f7MdEcGXa1x36RcEkHdu+M
yJ392eMgD+dKNfRCtyTPhjZTxbvNELIBYICfABEBAAEAB/wLJ0gyMjs2fFt83wM
5Lzz2yQIwV4t3bbIBAUjdHTqeN5Zmsm/oakFyjsokULK96Kv0R4ej9eoIgmFvxFk
HRkrngxTrbsNJ7I6QcKYHTPeIj318yKnl6fj0WJUcdPIENukXl5jbqNyk3/4D2y
TTDySyq6jHTgvMH4K4KJUSpglvSJpntTk9RhuFGHAF+sNR9atygdYctAaERMRtSg
LCoSt/AoX5GRMIQjXT9oqQjwSQoZyF4s8HMC8wdTFIE/E0L4IVdHVP8sz2UzNtT
W/evmCA+KVruKjRH/Fhrq4hHkEamW28+j4L6uAyagONP7BONs+S5Oo2zTT9+tV2R
ILTZBADdLuAgF6C5Lu9jCF6DfFgaT/uafMyQNkEGNlxOHMWHTgLHe475V2eG9gA
```

amd4yXKyEFKU1PWnvlGuicQSGdzVcwmq61msvXgYD0FK3LP3yWzKnE4X1tzc9Vp  
/uHJxKjewCuyt1f5in919v+T8TbUxBYKC0zX/qWtX+10cTx77QQA6leqhToJ95Yc  
u4UBrKMEO+y2v8Svb3LG7yI5oY8tkw0EkJ/kpZ8xTAFZYCe6fXdVVE3PHg2lrxyc  
Wv/EU3QY/qA3G82mbXYeJ2jNZaTNYo4MylMrt4Mx25x4ke7JlsE8SVrQ+4CrHkqp  
OjSIa7fppLrQ78uW980AtN8NNQGriTsD/A9aoA60IgxY1Q3K2uSyDCyJLknv57ym  
ZSBD3/t7m0l6Q6gdbfhNGosT+Hd4y3actqEqzXZHW2VG4dKZ/wRNkxtSm9adU9vs  
EHyzxb6mKIH32zAG5TaFT20hC+NK6lsyHr9UE2ZrS6ma2sLxGW2O40hqNsdD+5m  
NrqeBc2I/js1PMK0EHRlc3RAZXhbbXBsZS5vcmeJAVQEEwEIAD4WIQTUFzW5Ejb9  
uIIEjFojAWNe7/DLBQUCWuwoSQIbAwUJA8JnAAULCQgHAgYVCgkICwIEFgIDAQIe  
AQIXgAAKCRajAWNe7/DLBf9kB/wOQ/S60HGwFq07W9N01HWULyhHKoMmcHL6rfZ6  
4oDqLxolPSasz7WAMW1jN4qtWJ0mFzwO83V6kaBe+wF6Kqir6udFSBW9rPcFg6/V  
ZXPltT0a6uacIHq6DyQ5iMW4YQWbVy9OR2rNgkYo1JCBR0XdRJYCSX3yB4TWv/eX  
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95uSmC6UY4hzyP84ORYMYn9n1QAR0goxDN6UunOf9Rlp1oMzdxMool/d1MICxg2h  
3jheuhv7lgUF4KpvhOuePXQ7UO417E0TYcDZ1J8Nsv87SZeEnQOYBFrsKEKBCADj  
oEBhG/QPqZHg8VyoD1xYRAWGxyDJKX/GrSs6yE+x2hk5FoQCajxKa/d4AVxOnJpd  
whAfeXeSNaql5Ejzax+Tdj9BV6vtGVJVv0pO7bgAiZxkA6RHxtNqhpPnPQoXvUz  
kzpRgpL+Nj4yIg7z1ITH6KQH4u5SI9vd+j/8i9Taz67pdZwuJjac8qBuJHjzAo1  
bjYctFYUSG5pbmMQyNlySzziNkFa4DajODlt3RuqVGP316Fk+Sy2+60tC/HIX8jg  
MyMONfOGBQx6jk8tvAphS/LAqrrNepnagIyLUGKU+L8cB2g1PGGp2biBFWqZbudZ  
oyRBet/0yH/zirBdQJw1ABEBAAEAB/4IN3gXOI4OuoOcsvHak4pebx61Mt0YP9cT  
qZASIBqxok5x8E28pFh/tYfkYdqRCtdNYZOnxcEoUWh5j6nfwZkEnJ9P/T8GPNk7  
pMKnKXmExi05b5uGHD8nU1rSbf/YkvAF0vpxb4/RDxbbtQhbUwGzusSI+pBLM0w  
5TreEB+VRGBc2gOvXXOtKLNEa7M9rH2EwbAkP3jOGGwgk6adxbQdBcRqx4merqHL  
YrVz73bCj8TDc0fsNJyIaZZJ++ejfBFYavsF1pvx9z7FNFi8rSXoiB3SBtaWGfhr  
bwNaMZrDc7TRIq/fGgaL6g//bzcWrr1YaHXZ10Bgx6UymDOIYkCpBADm0Hv46sPw  
07SO8+IACcaQliOto1pndOPwTimCeo58/7rf8I2a5uuJloGrnPwAX65bKDnUALp6  
X3lnXRNmhnB3Uewx4i00LQmjsxhJfQiGLpMv0j58tn64s7GqQzGVV1JKcQm992RV  
jFOydyjZ+K4LGWEOITG/bZrMEVNGCM+OnQQA/Haz8xN0NFSIq7tyfFc0pkx/TiCX  
xGfBqbO0wU2b5GMnZbY/06HENpidIzpa231VQaw5/nPTvfhllKW1iGAkc148cX1q  
IL9w2ksXuaHR3LXud2VcfVTIdXU/7h7u1dD/85+c0+7jlGOBd9cXKxIM6OjPIJ1  
l5/1h3C5S0TuxHkEAL/3BGihkhNfv1Xx0rWu0/732usX/nE/A9C26hGu41FUf3fp  
0ilonKpKZUEwWt5hWSEFCsrznNvekiO0rxvuu3RVegvzThPNU4Pf4JztJpRVhvUQ  
d9ulxJw7V9rs75uNBatTNC0kXuGoXhehw4Bn93xa67gYGD3LfrH+oT0GCDpTSHCJ  
ATwEGAEIACYWIQTUFzW5Ejb9uIIEjFojAWNe7/DLBQUCWuwoSQIbDAUJA8JnAAAK  
CRajAWNe7/DLBf0pCACPP5hBuUWngu2Hqvg+tNiujsiYzId3MfffXEk3CbXeHcJ  
5F32NDJ9PYCnra4L8wSv+Nzt9gIa8IFwoFSFQCjzH7KE86XcV3MhfdJTNb/+9CR7  
Jq3e/4Iy0N5ipPNYMCyakcAsxvsNCJKrSaDuYe/OAoTXRBtgRWE2uyT315em02L  
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23nntMSDA+0/I7ESO9JsWvJbyBmuiZpu9JjScOjYH9xpQLqRNyW4WHpZriN69F0t  
9Mmd7bM1+UyPgbPER0iWMeyctYsuOLEUyQKMscDT  
=hkUm

-----END PGP PRIVATE KEY BLOCK-----

\input texinfo @c -\* texinfo -\*

@c %\*\*start of header

@setfilename maintenance-mode.info

@settitle Maintenance Mode

@documentencoding utf-8

@documentlanguage en

@c %\*\*end of header

@finalout

@titlepage

@title Maintenance Mode

@author Ben McGinnes

@end titlepage

@contents

@ifnottex

@node Top

@top Maintenance Mode

@end ifnottex

@menu

\* Maintenance Mode from 2019::

@detailmenu

--- The Detailed Node Listing ---

Maintenance Mode from 2019

\* Maintainer from 2019 onward::

\* Using the Python Bindings from 2019 and beyond::

\* Documentation formats::

Documentation formats

\* Cautionary Notes regarding Sphinx and EPUB::

@end detailmenu

@end menu

@node Maintenance Mode from 2019

@chapter Maintenance Mode from 2019

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.0.1

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English  
@item xml:lang:  
@tab en-AU, en-GB, en  
@end multitable

From the beginning of 2019 the Python bindings to GPGME will enter maintenance mode, meaning that new features will not be added and only bug fixes and security fixes will be made. This also means that documentation beyond that existing at the end of 2018 will not be developed further except to correct errors.

Though use of these bindings appears to have been quite well received, there has been no indication of what demand there is, if any for either financial backing of the current Python bindings development or support contracts with g10code GmbH citing the necessity of including the bindings.

@menu  
\* Maintainer from 2019 onward::  
\* Using the Python Bindings from 2019 and beyond::  
\* Documentation formats::  
@end menu

@node Maintainer from 2019 onward  
@section Maintainer from 2019 onward

How does this affect the position of GnuPG Python Bindings Maintainer?

Well, I will remain as maintainer of the bindings; but without funding for that position, the amount of time I will be able to dedicate solely to this task will be limited and reduced to volunteered time. As with all volunteered time and effort in free software projects, this will be subject to numerous external imperatives.

@node Using the Python Bindings from 2019 and beyond  
@section Using the Python Bindings from 2019 and beyond

For most, if not all, Python developers using these bindings; they will continue to just work the same as they always have. Expansions of GPGME itself are usually handled by SWIG with the existing code and thus bindings are generated properly when the bindings are installed alongside GPGME and when the latter is built from source.

In the rare circumstances where that is not enough to address some new addition to GPGME, then that is a bug and thus subject to the maintenance mode provisions (i.e. it will be fixed following a bug report being raised and your humble author will need to remember where the timesheet template was filed, depending on how many years off such

an event is).

All the GPGME functionality will continue to be accessible via the lower level, dynamically generated methods which match the GPGME C documentation. While the more intuitively Pythonic higher level layer already covers the vast majority of functionality people require with key generation, signatures, certifications (key signing), encryption, decryption, verification, validation, trust levels and so on.

Any wanted features lacking in the Python bindings are usually lacking because they are missing from GPGME itself (e.g. revoking keys via the API) and in such cases they are usually deliberately excluded. More discussion of these issues can be found in the archives of the [@uref{https://lists.gnupg.org/mailman/listinfo/gnupg-devel}](https://lists.gnupg.org/mailman/listinfo/gnupg-devel), [gnupg-devel mailing list](#)).

Any features existing in the dynamically generated layer for which people want a specific, higher level function included to make it more Pythonic (e.g. to avoid needing to learn or memorise cryptographic mode values or GnuPG status code numbers), would be a feature request and **not** a bug.

It is still worthwhile requesting it, but the addition of such a feature would not be guaranteed and provided on a purely volunteer basis. Expediting such a request would require funding that request.

Those with a commercial interest in expediting such a feature request already know how to [@uref{https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset}](https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset), [expedite it](#) (use the message field to state what feature is being requested).

`@node Documentation formats`  
`@section Documentation formats`

The documentation has been written in Org mode for GNU Emacs, with both Texinfo and reStructuredText formats generated from that. The Texinfo files are intended for use with the rest of the GnuPG documentation; while the reStructuredText files are intended for use with Docutils and Sphinx, as with other Python projects.

`@menu`  
\* Cautionary Notes regarding Sphinx and EPUB::  
`@end menu`

`@node Cautionary Notes regarding Sphinx and EPUB`  
`@subsection Cautionary Notes regarding Sphinx and EPUB`

Though Python's Docutils in conjunction with Sphinx is capable of generating some very useful HTML sites, as proven by [@uref{https://readthedocs.org/}](https://readthedocs.org/), [Read the Docs](#) and

the [@uref{https://docs.python.org/}](https://docs.python.org/), Python documentation}, there are a number of output formats it does not handle well. At the top of the list of things it manages to break so atrociously as to be embarrassing is the [@uref{http://idpf.org/epub}](http://idpf.org/epub), EPUB 3} format.

The automatically generated EPUB of the CPython documentation always contains hundreds of validation errors and even the modest amount of documentation here [@uref{https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub}](https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub), produced a file with approximately thirty validation errors. As the volume of documentation content increases, so does the induced errors. Whereas Texinfo doesn't produce EPUB output at all, nor does Org-mode.

Should there ever be genuine demand for this format, lodge a [@uref{https://dev.gnupg.org/maniphest/task/edit/form/4/}](https://dev.gnupg.org/maniphest/task/edit/form/4/), feature request case marked for [@uref{https://dev.gnupg.org/p/BenM/}](https://dev.gnupg.org/p/BenM/), my attention. The means of generating such files flawlessly is already available, but is not yet part of the GnuPG build system. Nor is it integrated with a means of converting Org mode input files to the relevant base format automatically, as can already be done when converting Org to reStructuredText or Org to Texinfo. As a certain amount of work would be required to get it done, there would need to be clear demand for that work to be done.

@bye

;;; gpgme.lisp

;;; Copyright (C) 2006 g10 Code GmbH

;;;

;;; This file is part of GPGME-CL.

;;;

;;; GPGME-CL is free software; you can redistribute it and/or modify it

;;; under the terms of the GNU General Public License as published by

;;; the Free Software Foundation; either version 2 of the License, or

;;; (at your option) any later version.

;;;

;;; GPGME-CL is distributed in the hope that it will be useful, but

;;; WITHOUT ANY WARRANTY; without even the implied warranty of

;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU

;;; Lesser General Public License for more details.

;;;

;;; You should have received a copy of the GNU General Public License

;;; along with GPGME; if not, write to the Free Software Foundation,

;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.

;;; TODO

;;; Set up the library.

(in-package :gpgme)

```

(deftype byte-array ()
  '(simple-array (unsigned-byte 8) (*)))

(deftype character-array ()
  '(simple-array character (*)))

;;; Debugging.

(defvar *debug* nil "If debugging output should be given or not.")

;;; Load the foreign library.

(define-foreign-library libgpgme
  (:unix "libgpgme.so")
  (t (:default "libgpgme")))

(use-foreign-library libgpgme)

;;; System dependencies.

; Access to ERRNO.
(defun ("strerror" c-strerror) :string
  (err :int))

(defun get-errno ()
  *errno*)

(defun set-errno (errno)
  (setf *errno* errno))

(define-condition system-error (error)
  ((errno :initarg :errno :reader system-error-errno))
  (:report (lambda (c stream)
    (format stream "System error: ~A: ~A"
      (system-error-errno c)
      (c-strerror (system-error-errno c))))))
(:documentation "Signalled when an errno is encountered.))

; Needed to write passphrases.
(defun ("write" c-write) ssize-t
  (fd :int)
  (buffer :string) ; Actually :pointer, but we only need string.
  (size size-t))

(defun system-write (fd buffer size)
  (let ((res (c-write fd buffer size)))
    (when (< res 0) (error 'system-error :errno (get-errno))))

```

```

res))

;;;
;;; C Interface Definitions
;;;

;;; Data Type Interface

;;; Some new data types used for easier translation.

;;; The number of include certs. Translates to NIL for default.
(defctype cert-int-t
  (:wrapper :int
   :from-c translate-cert-int-t-from-foreign
   :to-c translate-cert-int-t-to-foreign))

;;; A string that may be NIL to indicate a null pointer.
(defctype string-or-nil-t
  (:wrapper :string
   :to-c translate-string-or-nil-t-to-foreign))

;;; Some opaque data types used by GPGME.

(defctype gpgme-ctx-t
  (:wrapper :pointer
   :to-c translate-gpgme-ctx-t-to-foreign)
  "The GPGME context type.")

(defctype gpgme-data-t
  (:wrapper :pointer
   :to-c translate-gpgme-data-t-to-foreign)
  "The GPGME data object type.")

;;; Wrappers for the libgpg-error library.

(defctype gpgme-error-t
  (:wrapper gpg-error::gpg-error-t
   :from-c translate-gpgme-error-t-from-foreign
   :to-c translate-gpgme-error-t-to-foreign)
  "The GPGME error type.")

(defctype gpgme-error-no-signal-t
  (:wrapper gpg-error::gpg-error-t
   :from-c translate-gpgme-error-no-signal-t-from-foreign)
  "The GPGME error type (this version does not signal conditions in translation.)")

(defctype gpgme-err-code-t gpg-error::gpg-err-code-t
  "The GPGME error code type.")

```

```

(defctype gpgme-err-source-t gpg-error::gpg-err-source-t
  "The GPGME error source type.")

(defun gpgme-err-make (source code)
  "Construct an error value from an error code and source."
  (gpg-err-make source code))

(defun gpgme-error (code)
  "Construct an error value from an error code."
  (gpgme-err-make :gpg-err-source-gpgme code))

(defun gpgme-err-code (err)
  "Retrieve an error code from the error value ERR."
  (gpg-err-code err))

(defun gpgme-err-source (err)
  "Retrieve an error source from the error value ERR."
  (gpg-err-source err))

(defun gpgme-strerror (err)
  "Return a string containing a description of the error code."
  (gpg-strerror err))

(defun gpgme-strsource (err)
  "Return a string containing a description of the error source."
  (gpg-strsource err))

(defun gpgme-err-code-from-errno (err)
  "Retrieve the error code for the system error. If the system error
  is not mapped, :gpg-err-unknown-errno is returned."
  (gpg-err-code-from-errno err))

(defun gpgme-err-code-to-errno (code)
  "Retrieve the system error for the error code. If this is not a
  system error, 0 is returned."
  (gpg-err-code-to-errno code))

(defun gpgme-err-make-from-errno (source err)
  (gpg-err-make-from-errno source err))

(defun gpgme-error-from-errno (err)
  (gpg-error-from-errno err))

;;;

(defcenum gpgme-data-encoding-t
  "The possible encoding mode of gpgme-data-t objects."

```

(:none 0)  
(:binary 1)  
(:base64 2)  
(:armor 3)  
(:url 4)  
(:urlesc 5)  
(:url0 6)  
(:mime 7))

:::

(defcenum gpgme-pubkey-algo-t  
"Public key algorithms from libgcrypt."

(:rsa 1)  
(:rsa-e 2)  
(:rsa-s 3)  
(:elg-e 16)  
(:dsa 17)  
(:ecc 18)  
(:elg 20)  
(:ecdsa 301)  
(:ecdh 302)  
(:eddsa 303))

(defcenum gpgme-hash-algo-t  
"Hash algorithms from libgcrypt."

(:none 0)  
(:md5 1)  
(:sha1 2)  
(:rmd160 3)  
(:md2 5)  
(:tiger 6)  
(:haval 7)  
(:sha256 8)  
(:sha384 9)  
(:sha512 10)  
(:sha224 11)  
(:md4 301)  
(:crc32 302)  
(:crc32-rfc1510 303)  
(:crc24-rfc2440 304))

:::

(defcenum gpgme-sig-mode-t  
"The available signature modes."

(:none 0)  
(:detach 1)

(:clear 2))

;;

(defcenum gpgme-validity-t

"The available validities for a trust item or key."

(:unknown 0)

(:undefined 1)

(:never 2)

(:marginal 3)

(:full 4)

(:ultimate 5))

;;

(defcenum gpgme-protocol-t

"The available protocols."

(:openpgp 0)

(:cms 1)

(:gpgconf 2)

(:assuan 3)

(:g13 4)

(:uiserver 5)

(:spawn 6)

(:default 254)

(:unknown 255))

;;

(defbitfield (gpgme-keylist-mode-t :unsigned-int)

"The available keylist mode flags."

(:local 1)

(:extern 2)

(:sigs 4)

(:sig-notations)

(:with-secret 16)

(:with-tofu 32)

(:ephemeral 128)

(:validate 256))

;;

(defbitfield (gpgme-sig-notation-flags-t :unsigned-int)

"The available signature notation flags."

(:human-readable 1)

(:critical 2))

(defctype gpgme-sig-notation-t

```
(:wrapper :pointer
 :from-c translate-gpgme-sig-notation-t-from-foreign)
"Signature notation pointer type.")
```

```
::: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-sig-notation-bitfield :unsigned-int)
 (:human-readable 1)
 (:critical 2))
```

```
(defcstruct gpgme-sig-notation
 "Signature notations."
 (next gpgme-sig-notation-t)
 (name :pointer)
 (value :pointer)
 (name-len :int)
 (value-len :int)
 (flags gpgme-sig-notation-flags-t)
 (bitfield gpgme-sig-notation-bitfield))
```

```
:::
```

```
(defcenum gpgme-status-code-t
 "The possible status codes for the edit operation."
 (:eof 0)
 (:enter 1)
 (:leave 2)
 (:abort 3)
 (:goodsig 4)
 (:badsig 5)
 (:errsig 6)
 (:badarmor 7)
 (:rsa-or-idea 8)
 (:keyexpired 9)
 (:keyrevoked 10)
 (:trust-undefined 11)
 (:trust-never 12)
 (:trust-marginal 13)
 (:trust-fully 14)
 (:trust-ultimate 15)
 (:shm-info 16)
 (:shm-get 17)
 (:shm-get-bool 18)
 (:shm-get-hidden 19)
 (:need-passphrase 20)
 (:validsig 21)
 (:sig-id 22)
 (:enc-to 23)
 (:nodata 24))
```

(:bad-passphrase 25)  
(:no-pubkey 26)  
(:no-seckey 27)  
(:need-passphrase-sym 28)  
(:decryption-failed 29)  
(:decryption-okay 30)  
(:missing-passphrase 31)  
(:good-passphrase 32)  
(:goodmdc 33)  
(:badmdc 34)  
(:errmdc 35)  
(:imported 36)  
(:import-ok 37)  
(:import-problem 38)  
(:import-res 39)  
(:file-start 40)  
(:file-done 41)  
(:file-error 42)  
(:begin-decryption 43)  
(:end-decryption 44)  
(:begin-encryption 45)  
(:end-encryption 46)  
(:delete-problem 47)  
(:get-bool 48)  
(:get-line 49)  
(:get-hidden 50)  
(:got-it 51)  
(:progress 52)  
(:sig-created 53)  
(:session-key 54)  
(:notation-name 55)  
(:notation-data 56)  
(:policy-url 57)  
(:begin-stream 58)  
(:end-stream 59)  
(:key-created 60)  
(:userid-hint 61)  
(:unexpected 62)  
(:inv-recp 63)  
(:no-recp 64)  
(:already-signed 65)  
(:sigexpired 66)  
(:expsig 67)  
(:expkeysig 68)  
(:truncated 69)  
(:error 70)  
(:newsig 71)  
(:revkeysig 72)

```
(:sig-subpacket 73)
(:need-passphrase-pin 74)
(:sc-op-failure 75)
(:sc-op-success 76)
(:cardctrl 77)
(:backup-key-created 78)
(:pka-trust-bad 79)
(:pka-trust-good 80)
(:plaintext 81)
(:inv-sgnr 82)
(:no-sgnr 83)
(:success 84)
(:decryption-info 85)
(:plaintext-length 86)
(:mountpoint 87)
(:pinentry-launched 88)
(:attribute 89)
(:begin-signing 90)
(:key-not-created 91)
(:inquire-maxlen 92)
(:failure 93)
(:key-considered 94)
(:tofu-user 95)
(:tofu-stats 96)
(:tofu-stats-long 97)
(:notation-flags 98)
(:decryption-compliance-mode 99)
(:verification-compliance-mode 100))
```

```
;;
```

```
(defctype gpgme-engine-info-t
  (:wrapper :pointer
   :from-c translate-gpgme-engine-info-t-to-foreign)
  "The engine information structure pointer type.")
```

```
(defcstruct gpgme-engine-info
  "Engine information."
  (next gpgme-engine-info-t)
  (protocol gpgme-protocol-t)
  (file-name :string)
  (version :string)
  (req-version :string)
  (home-dir :string))
```

```
;;
```

```
(defctype gpgme-subkey-t
```

```
(:wrapper :pointer
 :from-c translate-gpgme-subkey-t-from-foreign)
"A subkey from a key.")
```

```
:: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-subkey-bitfield :unsigned-int)
 "The subkey bitfield."
 (:revoked 1)
 (:expired 2)
 (:disabled 4)
 (:invalid 8)
 (:can-encrypt 16)
 (:can-sign 32)
 (:can-certify 64)
 (:secret 128)
 (:can-authenticate 256)
 (:is-qualified 512)
 (:is-cardkey 1024)
 (:is-de-vs 2048))
```

```
(defcstruct gpgme-subkey
 "Subkey from a key."
 (next gpgme-subkey-t)
 (bitfield gpgme-subkey-bitfield)
 (pubkey-algo gpgme-pubkey-algo-t)
 (length :unsigned-int)
 (keyid :string)
 (-keyid :char :count 17)
 (fpr :string)
 (timestamp :long)
 (expires :long))
```

```
(defctype gpgme-key-sig-t
 (:wrapper :pointer
 :from-c translate-gpgme-key-sig-t-from-foreign)
 "A signature on a user ID.")
```

```
:: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-key-sig-bitfield :unsigned-int)
 "The key signature bitfield."
 (:revoked 1)
 (:expired 2)
 (:invalid 4)
 (:exportable 16))
```

```
(defcstruct gpgme-key-sig
 "A signature on a user ID."
```

```
(next gpgme-key-sig-t)
(bitfield gpgme-key-sig-bitfield)
(pubkey-algo gpgme-pubkey-algo-t)
(keyid :string)
(-keyid :char :count 17)
(timestamp :long)
(expires :long)
(status gpgme-error-no-signal-t)
(-class :unsigned-int)
(uid :string)
(name :string)
(email :string)
(comment :string)
(sig-class :unsigned-int))
```

```
(defctype gpgme-user-id-t
  (:wrapper :pointer
   :from-c translate-gpgme-user-id-t-from-foreign)
  "A user ID from a key.")
```

```
:: FIXME: Doesn't this depend on endianness?
```

```
(defbitfield (gpgme-user-id-bitfield :unsigned-int)
  "The user ID bitfield."
  (:revoked 1)
  (:invalid 2))
```

```
(defcstruct gpgme-user-id
  "A user ID from a key."
  (next gpgme-user-id-t)
  (bitfield gpgme-user-id-bitfield)
  (validity gpgme-validity-t)
  (uid :string)
  (name :string)
  (email :string)
  (comment :string)
  (signatures gpgme-key-sig-t)
  (-last-keysig gpgme-key-sig-t))
```

```
(defctype gpgme-key-t
  (:wrapper :pointer
   :from-c translate-gpgme-key-t-from-foreign
   :to-c translate-gpgme-key-t-to-foreign)
  "A key from the keyring.")
```

```
:: FIXME: Doesn't this depend on endianness?
```

```
(defbitfield (gpgme-key-bitfield :unsigned-int)
```

```
"The key bitfield."  
(:revoked 1)  
(:expired 2)  
(:disabled 4)  
(:invalid 8)  
(:can-encrypt 16)  
(:can-sign 32)  
(:can-certify 64)  
(:secret 128)  
(:can-authenticate 256)  
(:is-qualified 512))
```

```
(defcstruct gpgme-key  
  "A signature on a user ID."  
  (-refs :unsigned-int)  
  (bitfield gpgme-key-bitfield)  
  (protocol gpgme-protocol-t)  
  (issuer-serial :string)  
  (issuer-name :string)  
  (chain-id :string)  
  (owner-trust gpgme-validity-t)  
  (subkeys gpgme-subkey-t)  
  (uids gpgme-user-id-t)  
  (-last-subkey gpgme-subkey-t)  
  (-last-uid gpgme-user-id-t)  
  (keylist-mode gpgme-keylist-mode-t))
```

```
;;;
```

```
;;; There is no support in CFFI to define callback C types and have  
;;; automatic type checking with the callback definition.
```

```
(defctype gpgme-passphrase-cb-t :pointer)
```

```
(defctype gpgme-progress-cb-t :pointer)
```

```
(defctype gpgme-edit-cb-t :pointer)
```

```
;;;
```

```
;;; Function Interface
```

```
;;;
```

```
;;; Context management functions.
```

```
(defcfun ("gpgme_new" c-gpgme-new) gpgme-error-t  
  (ctx :pointer))
```

```

(defcfun ("gpgme_release" c-gpgme-release) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_protocol" c-gpgme-set-protocol) gpgme-error-t
  (ctx gpgme-ctx-t)
  (proto gpgme-protocol-t))

(defcfun ("gpgme_get_protocol" c-gpgme-get-protocol) gpgme-protocol-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_get_protocol_name" c-gpgme-get-protocol-name) :string
  (proto gpgme-protocol-t))

(defcfun ("gpgme_set_armor" c-gpgme-set-armor) :void
  (ctx gpgme-ctx-t)
  (yes :boolean))

(defcfun ("gpgme_get_armor" c-gpgme-get-armor) :boolean
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_textmode" c-gpgme-set-textmode) :void
  (ctx gpgme-ctx-t)
  (yes :boolean))

(defcfun ("gpgme_get_textmode" c-gpgme-get-textmode) :boolean
  (ctx gpgme-ctx-t))

(defconstant +include-certs-default+ -256)

(defcfun ("gpgme_set_include_certs" c-gpgme-set-include-certs) :void
  (ctx gpgme-ctx-t)
  (nr-of-certs cert-int-t))

(defcfun ("gpgme_get_include_certs" c-gpgme-get-include-certs) cert-int-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_keylist_mode" c-gpgme-set-keylist-mode) gpgme-error-t
  (ctx gpgme-ctx-t)
  (mode gpgme-keylist-mode-t))

(defcfun ("gpgme_get_keylist_mode" c-gpgme-get-keylist-mode)
  gpgme-keylist-mode-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_passphrase_cb" c-gpgme-set-passphrase-cb) :void
  (ctx gpgme-ctx-t)
  (cb gpgme-passphrase-cb-t)
  (hook-value :pointer))

```

```

(defcfun ("gpgme_get_passphrase_cb" c-gpgme-get-passphrase-cb) :void
  (ctx gpgme-ctx-t)
  (cb-p :pointer)
  (hook-value-p :pointer))

(defcfun ("gpgme_set_progress_cb" c-gpgme-set-progress-cb) :void
  (ctx gpgme-ctx-t)
  (cb gpgme-progress-cb-t)
  (hook-value :pointer))

(defcfun ("gpgme_get_progress_cb" c-gpgme-get-progress-cb) :void
  (ctx gpgme-ctx-t)
  (cb-p :pointer)
  (hook-value-p :pointer))

(defcfun ("gpgme_set_locale" c-gpgme-set-locale) gpgme-error-t
  (ctx gpgme-ctx-t)
  (category :int)
  (value string-or-nil-t))

(defcfun ("gpgme_ctx_get_engine_info" c-gpgme-ctx-get-engine-info)
  gpgme-engine-info-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_ctx_set_engine_info" c-gpgme-ctx-set-engine-info)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (proto gpgme-protocol-t)
  (file-name string-or-nil-t)
  (home-dir string-or-nil-t))

;;;

(defcfun ("gpgme_pubkey_algo_name" c-gpgme-pubkey-algo-name) :string
  (algo gpgme-pubkey-algo-t))

(defcfun ("gpgme_hash_algo_name" c-gpgme-hash-algo-name) :string
  (algo gpgme-hash-algo-t))

;;;

(defcfun ("gpgme_signers_clear" c-gpgme-signers-clear) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_signers_add" c-gpgme-signers-add) gpgme-error-t
  (ctx gpgme-ctx-t)
  (key gpgme-key-t))

```

```

(defcfun ("gpgme_signers_enum" c-gpgme-signers-enum) gpgme-key-t
  (ctx gpgme-ctx-t)
  (seq :int))

;;;

(defcfun ("gpgme_sig_notation_clear" c-gpgme-sig-notation-clear) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_sig_notation_add" c-gpgme-sig-notation-add) gpgme-error-t
  (ctx gpgme-ctx-t)
  (name :string)
  (value string-or-nil-t)
  (flags gpgme-sig-notation-flags-t))

(defcfun ("gpgme_sig_notation_get" c-gpgme-sig-notation-get)
  gpgme-sig-notation-t
  (ctx gpgme-ctx-t))

;;; Run Control.

;;; There is no support in CFFI to define callback C types and have
;;; automatic type checking with the callback definition.

(defctype gpgme-io-cb-t :pointer)

(defctype gpgme-register-io-cb-t :pointer)

(defctype gpgme-remove-io-cb-t :pointer)

(defcenum gpgme-event-io-t
  "The possible events on I/O event callbacks."
  (:start 0)
  (:done 1)
  (:next-key 2)
  (:next-trustitem 3))

(defctype gpgme-event-io-cb-t :pointer)

(defcstruct gpgme-io-cbs
  "I/O callbacks."
  (add gpgme-register-io-cb-t)
  (add-priv :pointer)
  (remove gpgme-remove-io-cb-t)
  (event gpgme-event-io-cb-t)
  (event-priv :pointer))

```

```
(defctype gpgme-io-cbs-t :pointer)
```

```
(defcfun ("gpgme_set_io_cbs" c-gpgme-set-io-cbs) :void  
(ctx gpgme-ctx-t)  
(io-cbs gpgme-io-cbs-t))
```

```
(defcfun ("gpgme_get_io_cbs" c-gpgme-get-io-cbs) :void  
(ctx gpgme-ctx-t)  
(io-cbs gpgme-io-cbs-t))
```

```
(defcfun ("gpgme_wait" c-gpgme-wait) gpgme-ctx-t  
(ctx gpgme-ctx-t)  
(status-p :pointer)  
(hang :int))
```

;;; Functions to handle data objects.

;;; There is no support in CFFI to define callback C types and have  
;;; automatic type checking with the callback definition.

```
(defctype gpgme-data-read-cb-t :pointer)  
(defctype gpgme-data-write-cb-t :pointer)  
(defctype gpgme-data-seek-cb-t :pointer)  
(defctype gpgme-data-release-cb-t :pointer)
```

```
(defcstruct gpgme-data-cbs  
"Data callbacks."  
(read gpgme-data-read-cb-t)  
(write gpgme-data-write-cb-t)  
(seek gpgme-data-seek-cb-t)  
(release gpgme-data-release-cb-t))
```

```
(defctype gpgme-data-cbs-t :pointer  
"Data callbacks pointer.")
```

```
(defcfun ("gpgme_data_read" c-gpgme-data-read) ssize-t  
(dh gpgme-data-t)  
(buffer :pointer)  
(size size-t))
```

```
(defcfun ("gpgme_data_write" c-gpgme-data-write) ssize-t  
(dh gpgme-data-t)  
(buffer :pointer)  
(size size-t))
```

```
(defcfun ("gpgme_data_seek" c-gpgme-data-seek) off-t  
(dh gpgme-data-t)  
(offset off-t))
```

```

(whence :int))

(defcfun ("gpgme_data_new" c-gpgme-data-new) gpgme-error-t
  (dh-p :pointer))

(defcfun ("gpgme_data_release" c-gpgme-data-release) :void
  (dh gpgme-data-t))

(defcfun ("gpgme_data_new_from_mem" c-gpgme-data-new-from-mem) gpgme-error-t
  (dh-p :pointer)
  (buffer :pointer)
  (size size-t)
  (copy :int))

(defcfun ("gpgme_data_release_and_get_mem" c-gpgme-data-release-and-get-mem)
  :pointer
  (dh gpgme-data-t)
  (len-p :pointer))

(defcfun ("gpgme_data_new_from_cbs" c-gpgme-data-new-from-cbs) gpgme-error-t
  (dh-p :pointer)
  (cbs gpgme-data-cbs-t)
  (handle :pointer))

(defcfun ("gpgme_data_new_from_fd" c-gpgme-data-new-from-fd) gpgme-error-t
  (dh-p :pointer)
  (fd :int))

(defcfun ("gpgme_data_new_from_stream" c-gpgme-data-new-from-stream)
  gpgme-error-t
  (dh-p :pointer)
  (stream :pointer))

(defcfun ("gpgme_data_get_encoding" c-gpgme-data-get-encoding)
  gpgme-data-encoding-t
  (dh gpgme-data-t))

(defcfun ("gpgme_data_set_encoding" c-gpgme-data-set-encoding)
  gpgme-error-t
  (dh gpgme-data-t)
  (enc gpgme-data-encoding-t))

(defcfun ("gpgme_data_get_file_name" c-gpgme-data-get-file-name) :string
  (dh gpgme-data-t))

(defcfun ("gpgme_data_set_file_name" c-gpgme-data-set-file-name) gpgme-error-t
  (dh gpgme-data-t)
  (file-name string-or-nil-t))

```

```
(defcfun ("gpgme_data_new_from_file" c-gpgme-data-new-from-file) gpgme-error-t
  (dh-p :pointer)
  (fname :string)
  (copy :int))
```

```
(defcfun ("gpgme_data_new_from_filepart" c-gpgme-data-new-from-filepart)
  gpgme-error-t
  (dh-p :pointer)
  (fname :string)
  (fp :pointer)
  (offset off-t)
  (length size-t))
```

;;; Key and trust functions.

```
(defcfun ("gpgme_get_key" c-gpgme-get-key) gpgme-error-t
  (ctx gpgme-ctx-t)
  (fpr :string)
  (key-p :pointer)
  (secret :boolean))
```

```
(defcfun ("gpgme_key_ref" c-gpgme-key-ref) :void
  (key gpgme-key-t))
```

```
(defcfun ("gpgme_key_unref" c-gpgme-key-unref) :void
  (key gpgme-key-t))
```

;;; Crypto operations.

```
(defcfun ("gpgme_cancel" c-gpgme-cancel) gpgme-error-t
  (ctx gpgme-ctx-t))
```

;;;

```
(defctype gpgme-invalid-key-t
  (:wrapper :pointer
   :from-c translate-gpgme-invalid-key-t-from-foreign)
  "An invalid key structure.")
```

```
(defcstruct gpgme-invalid-key
  "An invalid key structure."
  (next gpgme-invalid-key-t)
  (fpr :string)
  (reason gpgme-error-no-signal-t))
```

;;; Encryption.

```

(defcstruct gpgme-op-encrypt-result
  "Encryption result structure."
  (invalid-recipients gpgme-invalid-key-t))

(defctype gpgme-op-encrypt-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-encrypt-result-t-from-foreign)
  "An encryption result structure.")

(defcfun ("gpgme_op_encrypt_result" c-gpgme-op-encrypt-result)
  gpgme-op-encrypt-result-t
  (ctx gpgme-ctx-t))

(defbitfield gpgme-encrypt-flags-t
  (:always-trust 1)
  (:no-encrypt-to 2)
  (:prepare 4)
  (:expect-sign 8)
  (:no-compress 16)
  (:symmetric 32)
  (:throw-keyids 64)
  (:wrap 128)
  (:want-address 256))

(defcfun ("gpgme_op_encrypt_start" c-gpgme-op-encrypt-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt" c-gpgme-op-encrypt) gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt_sign_start" c-gpgme-op-encrypt-sign-start)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt_sign" c-gpgme-op-encrypt-sign) gpgme-error-t
  (ctx gpgme-ctx-t)

```

```
(recp :pointer) ; Key array.  
(flags gpgme-encrypt-flags-t)  
(plain gpgme-data-t)  
(cipher gpgme-data-t))
```

```
::; Decryption.
```

```
(defctype gpgme-recipient-t  
  (:wrapper :pointer  
   :from-c translate-gpgme-recipient-t-from-foreign)  
  "A recipient structure.")
```

```
(defcstruct gpgme-recipient  
  "Recipient structure."  
  (next gpgme-recipient-t)  
  (keyid :string)  
  (-keyid :char :count 17)  
  (pubkey-algo gpgme-pubkey-algo-t)  
  (status gpgme-error-no-signal-t))
```

```
(defbitfield gpgme-op-decrypt-result-bitfield  
  "Decryption result structure bitfield."  
  (:wrong-key-usage 1)  
  (:is-de-vs 2)  
  (:is-mine 4))
```

```
(defcstruct gpgme-op-decrypt-result  
  "Decryption result structure."  
  (unsupported-algorithm :string)  
  (bitfield gpgme-op-decrypt-result-bitfield)  
  (recipients gpgme-recipient-t)  
  (file-name :string))
```

```
(defctype gpgme-op-decrypt-result-t  
  (:wrapper :pointer  
   :from-c translate-gpgme-op-decrypt-result-t-from-foreign)  
  "A decryption result structure.")
```

```
(defcfun ("gpgme_op_decrypt_result" c-gpgme-op-decrypt-result)  
  gpgme-op-decrypt-result-t  
  (ctx gpgme-ctx-t))
```

```
(defcfun ("gpgme_op_decrypt_start" c-gpgme-op-decrypt-start) gpgme-error-t  
  (ctx gpgme-ctx-t)  
  (cipher gpgme-data-t)  
  (plain gpgme-data-t))
```

```
(defcfun ("gpgme_op_decrypt" c-gpgme-op-decrypt) gpgme-error-t
```

```

(ctx gpgme-ctx-t)
(cipher gpgme-data-t)
(plain gpgme-data-t))

(defcfun ("gpgme_op_decrypt_verify_start" c-gpgme-op-decrypt-verify-start)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (cipher gpgme-data-t)
  (plain gpgme-data-t))

(defcfun ("gpgme_op_decrypt_verify" c-gpgme-op-decrypt-verify) gpgme-error-t
  (ctx gpgme-ctx-t)
  (cipher gpgme-data-t)
  (plain gpgme-data-t))

```

::: Signing.

```

(defctype gpgme-new-signature-t
  (:wrapper :pointer
   :from-c translate-gpgme-new-signature-t-from-foreign)
  "A new signature structure.")

```

```

(defcstruct gpgme-new-signature
  "New signature structure."
  (next gpgme-new-signature-t)
  (type gpgme-sig-mode-t)
  (pubkey-algo gpgme-pubkey-algo-t)
  (hash-algo gpgme-hash-algo-t)
  (-obsolete-class :unsigned-long)
  (timestamp :long)
  (fpr :string)
  (-obsolete-class-2 :unsigned-int)
  (sig-class :unsigned-int))

```

```

(defcstruct gpgme-op-sign-result
  "Signing result structure."
  (invalid-signers gpgme-invalid-key-t)
  (signatures gpgme-new-signature-t))

```

```

(defctype gpgme-op-sign-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-sign-result-t-from-foreign)
  "A signing result structure.")

```

```

(defcfun ("gpgme_op_sign_result" c-gpgme-op-sign-result)
  gpgme-op-sign-result-t
  (ctx gpgme-ctx-t))

```

```
(defcfun ("gpgme_op_sign_start" c-gpgme-op-sign-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (plain gpgme-data-t)
  (sig gpgme-data-t)
  (mode gpgme-sig-mode-t))
```

```
(defcfun ("gpgme_op_sign" c-gpgme-op-sign) gpgme-error-t
  (ctx gpgme-ctx-t)
  (plain gpgme-data-t)
  (sig gpgme-data-t)
  (mode gpgme-sig-mode-t))
```

```
::; Verify.
```

```
(defbitfield (gpgme-sigsum-t :unsigned-int)
  "Flags used for the summary field in a gpgme-signature-t."
  (:valid #x0001)
  (:green #x0002)
  (:red #x0004)
  (:key-revoked #x0010)
  (:key-expired #x0020)
  (:sig-expired #x0040)
  (:key-missing #x0080)
  (:crl-missing #x0100)
  (:crl-too-old #x0200)
  (:bad-policy #x0400)
  (:sys-error #x0800)
  (:tofu-conflict #x1000))
```

```
(defctype gpgme-signature-t
  (:wrapper :pointer
   :from-c translate-gpgme-signature-t-from-foreign)
  "A signature structure.")
```

```
::; FIXME: Doesn't this depend on endianness?
```

```
(defbitfield (gpgme-signature-bitfield :unsigned-int)
  "The signature bitfield."
  (:wrong-key-usage 1)
  (:pka-trust 2)
  (:chain-model 4)
  (:is-de-vs 8))
```

```
(defcstruct gpgme-signature
  "Signature structure."
  (next gpgme-signature-t)
  (summary gpgme-sigsum-t)
  (fpr :string)
  (status gpgme-error-no-signal-t))
```

```

(notations gpgme-sig-notation-t)
(timestamp :unsigned-long)
(exp-timestamp :unsigned-long)
(bitfield gpgme-signature-bitfield)
(Validity gpgme-validity-t)
(Validity-reason gpgme-error-no-signal-t)
(pubkey-algo gpgme-pubkey-algo-t)
(hash-algo gpgme-hash-algo-t))

(defcstruct gpgme-op-verify-result
  "Verify result structure."
  (signatures gpgme-signature-t)
  (file-name :string))

(defctype gpgme-op-verify-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-verify-result-t-from-foreign)
  "A verify result structure.")

(defcfun ("gpgme_op_verify_result" c-gpgme-op-verify-result)
  gpgme-op-verify-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_verify_start" c-gpgme-op-verify-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (sig gpgme-data-t)
  (signed-text gpgme-data-t)
  (plaintext gpgme-data-t))

(defcfun ("gpgme_op_verify" c-gpgme-op-verify) gpgme-error-t
  (ctx gpgme-ctx-t)
  (sig gpgme-data-t)
  (signed-text gpgme-data-t)
  (plaintext gpgme-data-t))

;;; Import.

(defbitfield (gpgme-import-flags-t :unsigned-int)
  "Flags used for the import status field."
  (:new #x0001)
  (:uid #x0002)
  (:sig #x0004)
  (:subkey #x0008)
  (:secret #x0010))

(defctype gpgme-import-status-t
  (:wrapper :pointer
   :from-c translate-gpgme-import-status-t-from-foreign)

```

```
"An import status structure.")
```

```
(defcstruct gpgme-import-status  
  "New import status structure."  
  (next gpgme-import-status-t)  
  (fpr :string)  
  (result gpgme-error-no-signal-t)  
  (status :unsigned-int))
```

```
(defcstruct gpgme-op-import-result  
  "Import result structure."  
  (considered :int)  
  (no-user-id :int)  
  (imported :int)  
  (imported-rsa :int)  
  (unchanged :int)  
  (new-user-ids :int)  
  (new-sub-keys :int)  
  (new-signatures :int)  
  (new-revocations :int)  
  (secret-read :int)  
  (secret-imported :int)  
  (secret-unchanged :int)  
  (skipped-new-keys :int)  
  (not-imported :int)  
  (imports gpgme-import-status-t))
```

```
(defctype gpgme-op-import-result-t  
  (:wrapper :pointer  
   :from-c translate-gpgme-op-import-result-t-from-foreign)  
  "An import status result structure.")
```

```
(defcfun ("gpgme_op_import_result" c-gpgme-op-import-result)  
  gpgme-op-import-result-t  
  (ctx gpgme-ctx-t))
```

```
(defcfun ("gpgme_op_import_start" c-gpgme-op-import-start) gpgme-error-t  
  (ctx gpgme-ctx-t)  
  (keydata gpgme-data-t))
```

```
(defcfun ("gpgme_op_import" c-gpgme-op-import) gpgme-error-t  
  (ctx gpgme-ctx-t)  
  (keydata gpgme-data-t))
```

```
::: Export.
```

```
(defcfun ("gpgme_op_export_start" c-gpgme-op-export-start) gpgme-error-t  
  (ctx gpgme-ctx-t))
```

```
(pattern :string)
(reserved :unsigned-int)
(keydata gpgme-data-t))
```

```
(defcfun ("gpgme_op_export" c-gpgme-op-export) gpgme-error-t
  (ctx gpgme-ctx-t)
  (pattern :string)
  (reserved :unsigned-int)
  (keydata gpgme-data-t))
```

;;; FIXME: Extended export interfaces require array handling.

;;; Key generation.

```
(defbitfield (gpgme-genkey-flags-t :unsigned-int)
  "Flags used for the key generation result bitfield."
  (:primary #x0001)
  (:sub #x0002)
  (:uid #x0004))
```

```
(defcstruct gpgme-op-genkey-result
  "Key generation result structure."
  (bitfield gpgme-genkey-flags-t)
  (fpr :string))
```

```
(defctype gpgme-op-genkey-result-t :pointer
  "A key generation result structure.")
```

```
(defcfun ("gpgme_op_genkey_result" c-gpgme-op-genkey-result)
  gpgme-op-genkey-result-t
  (ctx gpgme-ctx-t))
```

```
(defcfun ("gpgme_op_genkey_start" c-gpgme-op-genkey-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (parms :string)
  (pubkey gpgme-data-t)
  (seckey gpgme-data-t))
```

```
(defcfun ("gpgme_op_genkey" c-gpgme-op-genkey) gpgme-error-t
  (ctx gpgme-ctx-t)
  (parms :string)
  (pubkey gpgme-data-t)
  (seckey gpgme-data-t))
```

;;; Key deletion.

```
(defcfun ("gpgme_op_delete_start" c-gpgme-op-delete-start) gpgme-error-t
  (ctx gpgme-ctx-t))
```

```

(key gpgme-key-t)
(allow-secret :int))

(defcfun ("gpgme_op_delete" c-gpgme-op-delete) gpgme-error-t
  (ctx gpgme-ctx-t)
  (key gpgme-key-t)
  (allow-secret :int))

;;; FIXME: Add edit interfaces.

;;; Keylist interface.

(defbitfield (gpgme-keylist-flags-t :unsigned-int)
  "Flags used for the key listing result bitfield."
  (:truncated #x0001))

(defcstruct gpgme-op-keylist-result
  "Key listing result structure."
  (bitfield gpgme-keylist-flags-t))

(defctype gpgme-op-keylist-result-t :pointer
  "A key listing result structure.")

(defcfun ("gpgme_op_keylist_result" c-gpgme-op-keylist-result)
  gpgme-op-keylist-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_keylist_start" c-gpgme-op-keylist-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (pattern :string)
  (secret_only :boolean))

;;; FIXME: Extended keylisting requires array handling.

(defcfun ("gpgme_op_keylist_next" c-gpgme-op-keylist-next) gpgme-error-t
  (ctx gpgme-ctx-t)
  (r-key :pointer))

(defcfun ("gpgme_op_keylist_end" c-gpgme-op-keylist-end) gpgme-error-t
  (ctx gpgme-ctx-t))

;;; Various functions.

(defcfun ("gpgme_check_version" c-gpgme-check-version) :string
  (req-version string-or-nil-t))

(defcfun ("gpgme_get_engine_info" c-gpgme-get-engine-info) gpgme-error-t
  (engine-info-p :pointer))

```

```
(defcfun ("gpgme_set_engine_info" c-gpgme-set-engine-info) gpgme-error-t
  (proto gpgme-protocol-t)
  (file-name string-or-nil-t)
  (home-dir string-or-nil-t))
```

```
(defcfun ("gpgme_engine_check_version" c-gpgme-engine-check-version)
  gpgme-error-t
  (proto gpgme-protocol-t))
```

```
;;;
```

```
;;; L I S P   I N T E R F A C E
```

```
;;;
```

```
;;;
```

```
;;; Lisp type translators.
```

```
;;;
```

```
;;; Both directions.
```

```
;;; cert-int-t is a helper type that takes care of representing the
;;; default number of certs as NIL.
```

```
(defun translate-cert-int-t-from-foreign (value)
  (cond
    ((eql value +include-certs-default+) nil)
    (t value)))
```

```
(defun translate-cert-int-t-to-foreign (value)
  (cond
    (value value)
    (t +include-certs-default+)))
```

```
;;; string-or-nil-t translates a null pointer to NIL and vice versa.
;;; Translation from foreign null pointer already works as expected.
```

```
(defun translate-string-or-nil-t-to-foreign (value)
  (cond
    (value value)
    (t (null-pointer))))
```

```
;;; Output only.
```

```
;;; These type translators only convert from foreign type, because we
;;; never use these types in the other direction.
```

```
;;; Convert gpgme-engine-info-t linked lists into a list of property
;;; lists. Note that this converter will automatically be invoked
```

```
;;; recursively.  
;;;  
;;; FIXME: Should we use a hash table (or struct, or clos) instead of  
;;; property list, as recommended by the Lisp FAQ?
```

```
(defun translate-gpgme-engine-info-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next protocol file-name version req-version home-dir)  
         value (:struct gpgme-engine-info))  
        (append (list protocol (list  
            :file-name file-name  
            :version version  
            :req-version req-version  
            :home-dir home-dir))  
                next))))))
```

```
(defun translate-gpgme-invalid-key-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next fpr reason)  
         value (:struct gpgme-invalid-key))  
        (append (list (list :fpr fpr  
            :reason reason))  
                next))))))
```

```
(defun translate-gpgme-op-encrypt-result-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((invalid-recipients)  
         value (:struct gpgme-op-encrypt-result))  
        (list :encrypt  
            (list :invalid-recipients invalid-recipients))))))
```

```
(defun translate-gpgme-recipient-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next keyid pubkey-algo status)  
         value (:struct gpgme-recipient))  
        (append (list (list :keyid keyid  
            :pubkey-algo pubkey-algo  
            :status status))  
                next))))))
```

```
(defun translate-gpgme-op-decrypt-result-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((unsupported-algorithm bitfield recipients file-name)
         value (:struct gpgme-op-decrypt-result))
        (list :decrypt (list :unsupported-algorithm unsupported-algorithm
            :bitfield bitfield
            :recipients recipients
            :file-name file-name))))))
```

```
(defun translate-gpgme-new-signature-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next type pubkey-algo hash-algo timestamp fpr sig-class)
         value (:struct gpgme-new-signature))
        (append (list (list :type type
            :pubkey-algo pubkey-algo
            :hash-algo hash-algo
            :timestamp timestamp
            :fpr fpr
            :sig-class sig-class))
            next))))))
```

```
(defun translate-gpgme-op-sign-result-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((invalid-signers signatures)
         value (:struct gpgme-op-sign-result))
        (list :sign (list :invalid-signers invalid-signers
            :signatures signatures))))))
```

```
(defun translate-gpgme-signature-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next summary fpr status notations timestamp
            exp-timestamp bitfield validity validity-reason
            pubkey-algo hash-algo)
         value (:struct gpgme-signature))
        (append (list (list :summary summary
            :fpr fpr
            :status status
            :notations notations
            :timestamp timestamp
            :exp-timestamp exp-timestamp
```

```
:bitfield bitfield
:validity validity
:validity-reason validity-reason
:pubkey-algo pubkey-algo))
next))))))
```

```
(defun translate-gpgme-op-verify-result-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((signatures file-name)
value (:struct gpgme-op-verify-result))
(list :verify (list :signatures signatures
:file-name file-name))))))
```

```
(defun translate-gpgme-import-status-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((next fpr result status)
value (:struct gpgme-import-status))
(append (list (list :fpr fpr
:result result
:status status))
next))))))
```

```
(defun translate-gpgme-op-import-result-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((considered no-user-id imported imported-rsa unchanged
new-user-ids new-sub-keys new-signatures
new-revocations secret-read secret-imported
secret-unchanged skipped-new-keys not-imported
imports)
value (:struct gpgme-op-import-result))
(list :verify (list :considered considered
:no-user-id no-user-id
:imported imported
:imported-rsa imported-rsa
:unchanged unchanged
:new-user-ids new-user-ids
:new-sub-keys new-sub-keys
:new-signatures new-signatures
:new-revocations new-revocations
:secret-read secret-read
:secret-imported secret-imported
:secret-unchanged secret-unchanged
```

```
:skipped-new-keys skipped-new-keys
:not-imported not-imported
:imports imports))))))
```

;;; Error handling.

;;; Use gpgme-error-no-signal-t to suppress automatic error handling  
;;; at translation time.

;;;

;;; FIXME: Part of this probably should be in gpg-error!

```
(define-condition gpgme-error (error)
  ((value :initarg :gpgme-error :reader gpgme-error-value))
  (:report (lambda (c stream)
             (format stream "GPGME returned error: ~A (~A)"
                     (gpgme-strerror (gpgme-error-value c))
                     (gpgme-strsource (gpgme-error-value c))))))
(:documentation "Signalled when a GPGME function returns an error."))
```

```
(defun translate-gpgme-error-t-from-foreign (value)
  "Raise a GPGME-ERROR if VALUE is non-zero."
  (when (not (eql (gpgme-err-code value) :gpg-err-no-error))
    (error 'gpgme-error :gpgme-error value))
  (gpg-err-canonicalize value))
```

```
(defun translate-gpgme-error-t-to-foreign (value)
  "Canonicalize the error value."
  (if (eql (gpgme-err-code value) :gpg-err-no-error)
      0
      (gpg-err-as-value value)))
```

```
(defun translate-gpgme-error-no-signal-t-from-foreign (value)
  "Canonicalize the error value."
  (gpg-err-canonicalize value))
```

;;; \*INTERNAL\* Lispy Function Interface that is still close to the C  
;;; interface.

;;; Passphrase callback management.

;;; Maybe: Instead, use subclassing, and provide a customizable  
;;; default implementation for ease-of-use.

```
(defvar *passphrase-handles* (make-hash-table)
  "Hash table with GPGME context address as key and the corresponding  
passphrase callback object as value.")
```

```

(defcallback passphrase-cb gpgme-error-t ((handle :pointer)
  (uid-hint :string)
  (passphrase-info :string)
  (prev-was-bad :boolean)
  (fd :int))
(handler-case
  (let* ((passphrase-cb
    (gethash (pointer-address handle) *passphrase-handles*))
    (passphrase
    (cond
      ((functionp passphrase-cb)
       (concatenate 'string
        (funcall passphrase-cb uid-hint passphrase-info
         prev-was-bad)
        '(\Newline))))
    (t (concatenate 'string passphrase-cb '(\Newline))))
    (passphrase-len (length passphrase))
    ;; FIXME: Could be more robust.
    (res (system-write fd passphrase passphrase-len)))
    (cond
      ((< res passphrase-len) ; FIXME: Blech. A weak attempt to be robust.
       (gpgme-error :gpg-err-ival))
      (t (gpgme-error :gpg-err-no-error))))
    (gpgme-error (err) (gpgme-error-value err))
    (system-error (err) (gpgme-error-from-errno (system-error-errno err)))
    ;; FIXME: The original error gets lost here.
    (condition (err) (progn
      (when *debug*
       (format t "DEBUG: passphrase-cb: Unexpressable: ~A~%"
        err))
      (gpgme-error :gpg-err-general))))))

;;; CTX is a C-pointer to the context.
(defun gpgme-set-passphrase-cb (ctx cb)
  "Set the passphrase callback for CTX."
  (let ((handle (pointer-address ctx)))
    (cond
      (cb (setf (gethash handle *passphrase-handles*) cb)
        (c-gpgme-set-passphrase-cb ctx (callback passphrase-cb) ctx)
        (t (c-gpgme-set-passphrase-cb ctx (null-pointer) (null-pointer))
         (remhash handle *passphrase-handles*))))))

;;; Progress callback management.

;;; Maybe: Instead, use subclassing, and provide a customizable
;;; default implementation for ease-of-use.

(defvar *progress-handles* (make-hash-table))

```

"Hash table with GPGME context address as key and the corresponding progress callback object as value.")

```
(defcallback progress-cb :void ((handle :pointer)
  (what :string)
  (type :int)
  (current :int)
  (total :int))
(handler-case
  (let* ((progress-cb
    (gethash (pointer-address handle) *progress-handles*)))
    (funcall progress-cb what type current total))
  ;; FIXME: The original error gets lost here.
  (condition (err) (when *debug*
    (format t "DEBUG: progress-cb: Unexpressable: ~A~%"
      err))))))
```

;;; CTX is a C-pointer to the context.

```
(defun gpgme-set-progress-cb (ctx cb)
  "Set the progress callback for CTX."
  (let ((handle (pointer-address ctx)))
    (cond
      (cb (setf (gethash handle *progress-handles*) cb))
      (c-gpgme-set-progress-cb ctx (callback progress-cb) ctx))
    (t (c-gpgme-set-progress-cb ctx (null-pointer) (null-pointer))
      (remhash handle *progress-handles*))))))
```

;;; Context management.

```
(defun gpgme-new (&key (protocol :openpgp) armor textmode include-certs
  keylist-mode passphrase progress file-name home-dir)
  "Allocate a new GPGME context."
  (with-foreign-object (ctx-p 'gpgme-ctx-t)
    (c-gpgme-new ctx-p)
    (let ((ctx (mem-ref ctx-p 'gpgme-ctx-t)))
      ;;; Set locale?
      (gpgme-set-protocol ctx protocol)
      (gpgme-set-armor ctx armor)
      (gpgme-set-textmode ctx textmode)
      (when include-certs (gpgme-set-include-certs ctx include-certs))
      (when keylist-mode (gpgme-set-keylist-mode ctx keylist-mode))
      (gpgme-set-passphrase-cb ctx passphrase)
      (gpgme-set-progress-cb ctx progress)
      (gpgme-set-engine-info ctx protocol
        :file-name file-name :home-dir home-dir)
      (when *debug* (format t "DEBUG: gpgme-new: ~A~%" ctx)
        ctx)))
```

```

(defun gpgme-release (ctx)
  "Release a GPGME context."
  (when *debug* (format t "DEBUG: gpgme-release: ~A~%" ctx))
  (c-gpgme-release ctx))

(defun gpgme-set-protocol (ctx proto)
  "Set the protocol to be used by CTX to PROTO."
  (c-gpgme-set-protocol ctx proto))

(defun gpgme-get-protocol (ctx)
  "Get the protocol used with CTX."
  (c-gpgme-get-protocol ctx))

;;; FIXME: How to do pretty printing?
;;;
;;; gpgme-get-protocol-name

(defun gpgme-set-armor (ctx armor)
  "If ARMOR is true, enable armor mode in CTX, disable it otherwise."
  (c-gpgme-set-armor ctx armor))

(defun gpgme-armor-p (ctx)
  "Return true if armor mode is set for CTX."
  (c-gpgme-get-armor ctx))

(defun gpgme-set-textmode (ctx textmode)
  "If TEXTMODE is true, enable text mode mode in CTX, disable it otherwise."
  (c-gpgme-set-textmode ctx textmode))

(defun gpgme-textmode-p (ctx)
  "Return true if text mode mode is set for CTX."
  (c-gpgme-get-textmode ctx))

(defun gpgme-set-include-certs (ctx &optional certs)
  "Include up to CERTS certificates in an S/MIME message."
  (c-gpgme-set-include-certs ctx certs))

(defun gpgme-get-include-certs (ctx)
  "Return the number of certs to include in an S/MIME message,
  or NIL if the default is used."
  (c-gpgme-get-include-certs ctx))

(defun gpgme-get-keylist-mode (ctx)
  "Get the keylist mode in CTX."
  (c-gpgme-get-keylist-mode ctx))

(defun gpgme-set-keylist-mode (ctx mode)
  "Set the keylist mode in CTX."

```

```
(c-gpgme-set-keylist-mode ctx mode))
```

```
::: FIXME: How to handle locale? cffi-grovel?
```

```
(defun gpgme-get-engine-info (&optional ctx)
  "Retrieve the engine info for CTX, or the default if CTX is omitted."
  (cond
   (ctx (c-gpgme-ctx-get-engine-info ctx))
   (t (with-foreign-object (info-p 'gpgme-engine-info-t)
      (c-gpgme-get-engine-info info-p)
      (mem-ref info-p 'gpgme-engine-info-t))))))
```

```
(defun gpgme-set-engine-info (ctx proto &key file-name home-dir)
  "Set the engine info for CTX, or the default if CTX is NIL."
  (cond
   (ctx (c-gpgme-ctx-set-engine-info ctx proto file-name home-dir))
   (t (c-gpgme-set-engine-info proto file-name home-dir))))
```

```
::: FIXME: How to do pretty printing?
```

```
:::
```

```
::: gpgme_pubkey_algo_name, gpgme_hash_algo_name
```

```
(defun gpgme-set-signers (ctx keys)
  "Set the signers for the context CTX."
  (c-gpgme-signers-clear ctx)
  (dolist (key keys) (c-gpgme-signers-add ctx key)))
```

```
:::
```

```
(defun gpgme-set-sig-notation (ctx notations)
  "Set the sig notation for the context CTX."
  (c-gpgme-sig-notation-clear ctx)
  (dolist (notation notations)
   (c-gpgme-sig-notation-add
    ctx (first notation) (second notation) (third notation))))
```

```
(defun gpgme-get-sig-notation (ctx)
  "Get the signature notation data for the context CTX."
  (c-gpgme-sig-notation-get ctx))
```

```
::: FIXME: Add I/O callback interface, for integration with clg.
```

```
::: FIXME: Add gpgme_wait?
```

```
::: Streams
```

```
::: -----
```

```
:::
```

```

;;; GPGME uses standard streams. You can define your own streams, or
;;; use the existing file or string streams.
;;;
;;; A stream-spec is either a stream, or a list with a stream as its
;;; first argument followed by keyword parameters: encoding,
;;; file-name.
;;;
;;; FIXME: Eventually, we should provide a class that can be mixed
;;; into stream classes and which provides accessors for encoding and
;;; file-names. This interface should be provided in addition to the
;;; above sleazy interface, because the sleazy interface is easier to
;;; use (less typing), and is quite sufficient in a number of cases.
;;;
;;; For best results, streams with element type (unsigned-byte 8)
;;; should be used. Character streams may work if armor mode is used.

```

```

;;; Do we need to provide access to GPGME data objects through streams
;;; as well? It seems to me that specific optimizations, like
;;; directly writing to file descriptors, is better done by extending
;;; the sleazy syntax (stream-spec) instead of customized streams.
;;; Customized streams do buffering, and this may mess up things. Mmh.

```

```

(defvar *data-handles* (make-hash-table)
  "Hash table with GPGME data user callback handle address as key
  and the corresponding stream as value.")

```

```

;;; The release callback removes the stream from the *data-handles*
;;; hash and releases the CBS structure that is used as the key in
;;; that hash. It is implicitly invoked (through GPGME) by
;;; gpgme-data-release.

```

```

(defcallback data-release-cb :void ((handle :pointer))
  (unwind-protect (remhash (pointer-address handle) *data-handles*)
    (when (not (null-pointer-p handle)) (foreign-free handle))))

```

```

(defcallback data-read-cb ssize-t ((handle :pointer) (buffer :pointer)
  (size size-t))
  (when *debug* (format t "DEBUG: gpgme-data-read-cb: want ~A~%" size))
  (let ((stream (gethash (pointer-address handle) *data-handles*)))
    (cond
      (stream
        (let* ((stream-type (stream-element-type stream))
              (seq (make-array size :element-type stream-type))
              (read (read-sequence seq stream)))
          (cond
            ((equal stream-type '(unsigned-byte 8))
             (dotimes (i read)
              (setf (mem-aref buffer :unsigned-char i)
                    (aref (the byte-array seq) i))))

```

```

((eql stream-type 'character)
 (dotimes (i read)
  (setf (mem-aref buffer :unsigned-char i)
        (char-code (aref (the character-array seq) i))))))
(t
 (dotimes (i read)
  (setf (mem-aref buffer :unsigned-char i)
        (coerce (aref seq i) '(unsigned-byte 8))))))
(when *debug* (format t "DEBUG: gpgme-data-read-cb: read ~A~%" read)
 read))
(t
 (set-errno +ebadf+
 -1))))

```

```

(defcallback data-write-cb ssize-t ((handle :pointer) (buffer :pointer)
 (size size-t)
 (when *debug* (format t "DEBUG: gpgme-data-write-cb: want ~A~%" size))
 (let ((stream (gethash (pointer-address handle) *data-handles*)))
 (cond
 (stream
 (let* ((stream-type (stream-element-type stream))
        (seq (make-array size :element-type stream-type)))
 (cond
 ((equal stream-type '(unsigned-byte 8))
 (dotimes (i size)
 (setf (aref (the byte-array seq) i)
        (mem-aref buffer :unsigned-char i))))
 ((eql stream-type 'character)
 (dotimes (i size)
 (setf (aref (the character-array seq) i)
        (code-char (mem-aref buffer :unsigned-char i))))))
 (t
 (dotimes (i size)
 (setf (aref seq i)
        (coerce (mem-aref buffer :unsigned-char i) stream-type))))))
 (write-sequence seq stream)
 size))
 (t
 (set-errno +ebadf+
 -1))))

```

;;; This little helper macro allows us to swallow the cbs structure by  
;;; simply setting it to a null pointer, but still protect against  
;;; conditions.

```

(defmacro with-cbs-swallowed ((cbs) &body body)
  `(let ((,cbs (foreign-alloc '(:struct gpgme-data-cbs))))
    (unwind-protect (progn ,@body)
      (when (not (null-pointer-p ,cbs)) (foreign-free ,cbs))))))

```

```

(defun gpgme-data-new (stream &key encoding file-name)
  "Allocate a new GPGME data object for STREAM."
  (with-foreign-object (dh-p 'gpgme-data-t)
    ;; We allocate one CBS structure for each stream we wrap in a
    ;; data object. Although we could also share all these
    ;; structures, as they contain the very same callbacks, we need a
    ;; unique C pointer as handle anyway to look up the stream in the
    ;; callback. This is a convenient one to use.
    (with-cbs-swallowed (cbs)
      (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'read)
            (callback data-read-cb))
      (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'write)
            (callback data-write-cb))
      (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'seek)
            (null-pointer))
      (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'release)
            (callback data-release-cb))
      (c-gpgme-data-new-from-cbs dh-p cbs cbs)
      (let ((dh (mem-ref dh-p 'gpgme-data-t)))
        (when encoding (gpgme-data-set-encoding dh encoding))
        (when file-name (gpgme-data-set-file-name dh file-name))
        ;; Install the stream into the hash table and swallow the cbs
        ;; structure while protecting against any errors.
        (unwind-protect
          (progn
            (setf (gethash (pointer-address cbs) *data-handles*) stream)
            (setf cbs (null-pointer)))
          (when (not (null-pointer-p cbs)) (c-gpgme-data-release dh)))
        (when *debug* (format t "DEBUG: gpgme-data-new: ~A~%" dh)
          dh))))

    ;; This function releases a GPGME data object. It implicitly
    ;; invokes the data-release-cb function to clean up associated junk.
    (defun gpgme-data-release (dh)
      "Release a GPGME data object."
      (when *debug* (format t "DEBUG: gpgme-data-release: ~A~%" dh))
      (c-gpgme-data-release dh))

    (defclass data ()
      (c-data) ; The C data object pointer
      (:documentation "The GPGME data type.))

    (defmethod initialize-instance :after ((data data) &key streamspec
                                           &allow-other-keys)
      (let ((c-data (if (listp streamspec)
                        (apply #'gpgme-data-new streamspec)
                        (gpgme-data-new streamspec))))

```

```

(cleanup t))
(unwind-protect
  (progn
    (setf (slot-value data 'c-data) c-data)
    (finalize data (lambda () (gpgme-data-release c-data)))
    (setf cleanup nil))
  (if cleanup (gpgme-data-release c-data))))

(defun translate-gpgme-data-t-to-foreign (value)
  ;; Allow a pointer to be passed directly for the finalizer to work.
  (cond
    ((null value) (null-pointer))
    ((pointerp value) value)
    (t (slot-value value 'c-data))))

(defmacro with-gpgme-data ((dh streamspec) &body body)
  `(let ((,dh (make-instance 'data :streamspec ,streamspec)))
    ,@body))

(defun gpgme-data-get-encoding (dh)
  "Get the encoding associated with the data object DH."
  (c-gpgme-data-get-encoding dh))

(defun gpgme-data-set-encoding (dh encoding)
  "Set the encoding associated with the data object DH to ENCODING."
  (c-gpgme-data-set-encoding dh encoding))

(defun gpgme-data-get-file-name (dh)
  "Get the file name associated with the data object DH."
  (c-gpgme-data-get-file-name dh))

(defun gpgme-data-set-file-name (dh file-name)
  "Set the file name associated with the data object DH to FILE-NAME."
  (c-gpgme-data-set-file-name dh file-name))

;;; FIXME: Add key accessor interfaces.

(defun gpgme-get-key (ctx fpr &optional secret)
  "Get the key with the fingerprint FPR from the context CTX."
  (with-foreign-object (key-p 'gpgme-key-t)
    (c-gpgme-get-key ctx fpr key-p secret)
    (mem-ref key-p 'gpgme-key-t)))

(defun gpgme-key-ref (key)
  "Acquire an additional reference to the key KEY."
  (when *debug* (format t "DEBUG: gpgme-key-ref: ~A~%" key))
  (c-gpgme-key-ref key))

```

```

(defun gpgme-key-unref (key)
  "Release a reference to the key KEY."
  (when *debug* (format t "DEBUG: gpgme-key-unref: ~A~%" key))
  (c-gpgme-key-unref key))

;;; FIXME: We REALLY need pretty printing for keys and all the other
;;; big structs.

;;; Various interfaces.

(defun gpgme-check-version (&optional req-version)
  (c-gpgme-check-version req-version))

;;;
;;; The *EXPORTED* CLOS interface.
;;;

;;; The context type.

;;; We wrap the C context pointer into a class object to be able to
;;; stick a finalizer on it.

(defclass context ()
  (c-ctx ; The C context object pointer.
   signers ; The list of signers.
   sig-notation) ; The list of signers.
  (:documentation "The GPGME context type.))

(defmethod initialize-instance :after ((ctx context) &rest rest
  &key &allow-other-keys)
  (let ((c-ctx (apply #'gpgme-new rest))
        (cleanup t))
    (unwind-protect
      (progn (setf (slot-value ctx 'c-ctx) c-ctx)
             (finalize ctx (lambda () (gpgme-release c-ctx))))
      (setf cleanup nil))
      (if cleanup (gpgme-release c-ctx))))))

(defun translate-gpgme-ctx-t-to-foreign (value)
  ;; Allow a pointer to be passed directly for the finalizer to work.
  (if (pointerp value) value (slot-value value 'c-ctx)))

(defmacro context (&rest rest)
  "Create a new GPGME context."
  `(make-instance 'context ,@rest))

;;; The context type: Accessor functions.

```

;;; The context type: Accessor functions: Protocol.

```
(defgeneric protocol (ctx)
  (:documentation "Get the protocol of CONTEXT."))
```

```
(defmethod protocol ((ctx context))
  (gpgme-get-protocol ctx))
```

```
(defgeneric (setf protocol) (protocol ctx)
  (:documentation "Set the protocol of CONTEXT to PROTOCOL."))
```

;;; FIXME: Adjust translator to reject invalid protocols. Currently,  
;;; specifying an invalid protocol throws a "NIL is not 32 signed int"  
;;; error. This is suboptimal.

```
(defmethod (setf protocol) (protocol (ctx context))
  (gpgme-set-protocol ctx protocol))
```

;;; The context type: Accessor functions: Armor.

;;; FIXME: Is it good style to make foop self-able? Or should it be  
;;; foo/foop for set/get?

```
(defgeneric armorp (ctx)
  (:documentation "Get the armor flag of CONTEXT."))
```

```
(defmethod armorp ((ctx context))
  (gpgme-armor-p ctx))
```

```
(defgeneric (setf armorp) (armor ctx)
  (:documentation "Set the armor flag of CONTEXT to ARMOR."))
```

```
(defmethod (setf armorp) (armor (ctx context))
  (gpgme-set-armor ctx armor))
```

;;; The context type: Accessor functions: Textmode.

;;; FIXME: Is it good style to make foop self-able? Or should it be  
;;; foo/foop for set/get?

```
(defgeneric textmodep (ctx)
  (:documentation "Get the text mode flag of CONTEXT."))
```

```
(defmethod textmodep ((ctx context))
  (gpgme-textmode-p ctx))
```

```
(defgeneric (setf textmodep) (textmode ctx)
  (:documentation "Set the text mode flag of CONTEXT to TEXTMODE."))
```

```
(defmethod (setf textmodep) (textmode (ctx context))
  (gpgme-set-textmode ctx textmode))
```

::: The context type: Accessor functions: Include Certs.

```
(defgeneric include-certs (ctx)
  (:documentation "Get the number of included certificates in an
    S/MIME message, or NIL if the default is used."))

(defmethod include-certs ((ctx context))
  (gpgme-get-include-certs ctx))

(defgeneric (setf include-certs) (certs ctx)
  (:documentation "Return the number of certificates to include in an
    S/MIME message, or NIL if the default is used."))

(defmethod (setf include-certs) (certs (ctx context))
  (gpgme-set-include-certs ctx certs))
```

::: The context type: Accessor functions: Engine info.

```
(defgeneric engine-info (ctx)
  (:documentation "Retrieve the engine info for CTX."))

(defmethod engine-info ((ctx context))
  (gpgme-get-engine-info ctx))

(defgeneric (setf engine-info) (info ctx)
  (:documentation "Set the engine info for CTX."))

(defmethod (setf engine-info) (info (ctx context))
  (dolist (proto '(:openpgp :cms))
    (let ((pinfo (getf info proto)))
      (when pinfo
        (gpgme-set-engine-info ctx proto :file-name (getf pinfo :file-name)
          :home-dir (getf pinfo :home-dir))))))
```

::: The context type: Accessor functions: Keylist mode.

```
(defgeneric keylist-mode (ctx)
  (:documentation "Get the keylist mode of CTX."))

(defmethod keylist-mode ((ctx context))
  (gpgme-get-keylist-mode ctx))

(defgeneric (setf keylist-mode) (mode ctx)
  (:documentation "Set the keylist mode of CTX to MODE."))

(defmethod (setf keylist-mode) (mode (ctx context))
  (gpgme-set-keylist-mode ctx mode))
```

::: The context type: Accessor functions: Signers.

```
(defgeneric signers (ctx)
  (:documentation "Get the signers of CTX."))

(defmethod signers ((ctx context))
  (slot-value ctx 'signers))

(defgeneric (setf signers) (signers ctx)
  (:documentation "Set the signers of CTX to SIGNERS."))

(defmethod (setf keylist-mode) (signers (ctx context))
  (gpgme-set-signers ctx signers)
  (setf (slot-value ctx 'signers) signers))
```

::: The context type: Accessor functions: Sig notations.

```
(defgeneric sig-notations (ctx)
  (:documentation "Get the signature notations of CTX."))

(defmethod sig-notations ((ctx context))
  (slot-value ctx 'signers))

(defgeneric (setf sig-notations) (notations ctx)
  (:documentation "Set the signature notations of CTX to NOTATIONS."))

(defmethod (setf sig-notations) (notations (ctx context))
  (gpgme-set-signers ctx notations)
  (setf (slot-value ctx 'notations) notations))
```

::: The context type: Support macros.

```
(defmacro with-context ((ctx &rest rest) &body body)
  `(let ((,ctx (make-instance 'context ,@rest)))
    ,@body))
```

::: The key type.

```
(defclass key ()
  (c-key) ; The C key object pointer.
  (:documentation "The GPGME key type."))
```

::: In the initializer, we swallow the c-key argument.

```
(defmethod initialize-instance :after ((key key) &key c-key
  &allow-other-keys)
  (setf (slot-value key 'c-key) c-key)
  (finalize key (lambda () (gpgme-key-unref c-key))))
```

```
(defun translate-gpgme-key-t-from-foreign (value)
  (when *debug* (format t "DEBUG: import key: ~A~%" value))
  (make-instance 'key :c-key value))
```

```
(defun translate-gpgme-key-t-to-foreign (value)
  ;; Allow a pointer to be passed directly for the finalizer to work.
  (if (pointerp value) value (slot-value value 'c-key)))
```

```
(defmethod print-object ((key key) stream)
  (print-unreadable-object (key stream :type t :identity t)
    (format stream "~s" (fpr key))))
```

;; The key type: Accessor functions.

;; FIXME: The bitfield and flags contain redundant information at  
;; this point. FIXME: Deal nicer with zero-length name (policy url)  
;; and zero length value (omit?) and human-readable (convert to string).  
;; FIXME: Turn binary data into sequence or vector or what it should be.  
;; FIXME: Turn the whole thing into a hash?

```
(defun translate-gpgme-sig-notation-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next name value name-len value-len flags bitfield)
         value (:struct gpgme-sig-notation))
      (append (list (list
                    :name name
                    :value value
                    :name-len name-len
                    :value-len value-len
                    :flags flags
                    :bitfield bitfield))
              next))))))
```

;; FIXME: Deal nicer with timestamps. bitfield field name?

```
(defun translate-gpgme-subkey-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next bitfield pubkey-algo length keyid fpr timestamp expires)
         value (:struct gpgme-subkey))
      (append (list (list
                    :bitfield bitfield
                    :pubkey-algo pubkey-algo
                    :length length
                    :keyid keyid
                    :fpr fpr
```

```
:timestamp timestamp
:expires expires))
next))))))
```

```
(defun translate-gpgme-key-sig-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next bitfield pubkey-algo keyid timestamp expires status
          uid name email comment sig-class)
         value (:struct gpgme-key-sig))
      (append (list (list
        :bitfield bitfield
        :pubkey-algo pubkey-algo
        :keyid keyid
        :timestamp timestamp
        :expires expires
        :status status
        :uid uid
        :name name
        :email email
        :comment comment
        :sig-class sig-class))
      next))))))
```

```
(defun translate-gpgme-user-id-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next bitfield validity uid name email comment signatures)
         value (:struct gpgme-user-id))
      (append (list (list
        :bitfield bitfield
        :validity validity
        :uid uid
        :name name
        :email email
        :comment comment
        :signatures signatures))
      next))))))
```

```
(defun key-data (key)
  (with-slots (c-key) key
    (with-foreign-slots
      ((bitfield protocol issuer-serial issuer-name chain-id
        owner-trust subkeys uids keylist-mode)
       c-key (:struct gpgme-key))
      (list
```

```

:bitfield bitfield
:protocol protocol
:issuer-serial issuer-serial
:issuer-name issuer-name
:chain-id chain-id
:owner-trust owner-trust
:subkeys subkeys
:uids uids
:keylist-mode keylist-mode))
))

```

```

(defgeneric fpr (key)
  (:documentation "Get the primary fingerprint of the key."))

```

```

(defmethod fpr ((key key))
  (getf (car (getf (key-data key) :subkeys)) :fpr))

```

::: The context type: Crypto-Operations.

```

(defgeneric get-key (ctx fpr &optional secret)
  (:documentation "Get the (secret) key FPR from CTX."))

```

```

(defmethod get-key ((ctx context) fpr &optional secret)
  (pgpme-get-key ctx fpr secret))

```

::: Encrypt.

```

(defgeneric op-encrypt (ctx recp plain cipher &key always-trust sign)
  (:documentation "Encrypt."))

```

```

(defmethod op-encrypt ((ctx context) recp plain cipher
  &key always-trust sign)
  (with-foreign-object (c-recp :pointer (+ 1 (length recp)))
    (dotimes (i (length recp))
      (setf (mem-aref c-recp 'pgpme-key-t i) (elt recp i)))
      (setf (mem-aref c-recp :pointer (length recp)) (null-pointer)))
    (with-gpgme-data (in plain)
      (with-gpgme-data (out cipher)
        (let ((flags))
          (if always-trust (push :always-trust flags))
          (cond
            (sign
             (c-gpgme-op-encrypt-sign ctx c-recp flags in out)
             (append (c-gpgme-op-encrypt-result ctx)
                      (c-gpgme-op-sign-result ctx))))
          (t

```

```
(c-gpgme-op-encrypt ctx c-recp flags in out)
(c-gpgme-op-encrypt-result ctx))))))
```

::: Decrypt.

```
(defgeneric op-decrypt (ctx cipher plain &key verify)
(:documentation "Decrypt."))
```

```
(defmethod op-decrypt ((ctx context) cipher plain &key verify)
(with-gpgme-data (in cipher)
(with-gpgme-data (out plain)
(cond
(verify
(c-gpgme-op-decrypt-verify ctx in out)
(append (c-gpgme-op-decrypt-result ctx)
(c-gpgme-op-verify-result ctx)))
(t
(c-gpgme-op-decrypt ctx in out)
(c-gpgme-op-decrypt-result ctx))))))
```

::: Signing.

```
(defgeneric op-sign (ctx plain sig &optional mode)
(:documentation "Sign."))
```

```
(defmethod op-sign ((ctx context) plain sig &optional (mode :none))
(with-gpgme-data (in plain)
(with-gpgme-data (out sig)
(c-gpgme-op-sign ctx in out mode)
(c-gpgme-op-sign-result ctx))))
```

::: Verify.

```
(defgeneric op-verify (ctx sig text &key detached)
(:documentation "Verify."))
```

```
(defmethod op-verify ((ctx context) sig text &key detached)
(with-gpgme-data (in sig)
(with-gpgme-data (on text)
(c-gpgme-op-verify ctx in (if detached on nil)
(if detached nil on))
(c-gpgme-op-verify-result ctx))))
```

::: Import.

```
(defgeneric op-import (ctx keydata)
(:documentation "Import."))
```

```
(defmethod op-import ((ctx context) keydata)
  (with-gpgme-data (in keydata)
    (c-gpgme-op-import ctx in)
    (c-gpgme-op-import-result ctx)))
```

::: Export.

```
(defgeneric op-export (ctx pattern keydata)
  (:documentation "Export public key data matching PATTERN to the
    stream KEYDATA."))
```

```
(defmethod op-export ((ctx context) pattern keydata)
  (with-gpgme-data (dh keydata)
    (c-gpgme-op-export ctx pattern 0 dh)))
```

::: Key generation.

:::

::: Initialization

:::

```
(defun check-version (&optional req-version)
  "Check that the GPGME version requirement is satisfied."
  (gpgme-check-version req-version))
```

```
(defparameter *version* (check-version)
  "The version number of GPGME used.")
(21:protected-private-key(3:elg(1:p193:5*n^f"Q'R0_6<y mec \=c7S8u[5
ZF'xf5yi9F@T=KhZdU0(k5nZEI/ R]njVITPU$W<xs-Yx)(1:g1:)(1:y192:O9GNR{?}Y_W[FD*zuRmk%'R\>>e9pe
eU)uS% VJ!5F)yH*O
]]7{ @wJmQP^jurx'V2H2j[G{q_"8(9:protected25:openpgp-s2k3-sha1-aes-cbc((4:sha18:o"%7:5242880)16:Hs* }u
)256:Gzk3%\Kb2=ooO@, )eBBI3F|OQP3eD%n,;~L-6UH^=64i);l
e+sG"(mlH_2sn_BBO7hRcZUt(p6,{5|37C3m8EY9=gQ )(12:protected-at15:20101008T070148)))
00~0
```

\*H

0k10 UDE10U

Dsseldorf10U

g10 Code GmbH10UAegypten Project10Utest cert 10

011203093638Z

021203093638Z0k10 UDE10U

Dsseldorf10U

g10 Code GmbH10UAegypten Project10Utest cert 100

\*H

0l+Pu.\-ZT\$e'nE&h4<}BePm[%j-/7PcHKi@FKy~npcd\$ {]K~Q00U37Tq8\_eK40U#037Tq8\_eK4om0k10 UDE10U

Dsseldorf10U

g10 Code GmbH10UAegypten Project10Utest cert 10U00

\*H

l8gD Z

wYL,M'j

pk2pf[L ;R1]#h\$~O!9;3e\A'v&P^\$'Oc.-TS~A>:fQY<

-----BEGIN PGP PUBLIC KEY BLOCK-----

```
mQENBFsMHecBCACqdJgqa+CeNYwPCK+MpOwAV6uFVjDyO2LmOs6+XfDWRBU/Zjtz
8zdYNKSbLjkWN4ujV5aiyA7MtEofszzYLEoKUtlwiDScHMpW8qmEFDv19g26MeAV
rTno9D5KodHvEIs8wnrqBs8ix0WLbh6J1Dtt8HQgIbN+v3gaRQrgBFe6z2ZYpHHx
ZfOu3iFKlm2WE/NekRkvvFIo3ApGvRhGIYw6JMmugBlo7s5xosJK0I9dkPGIEEtt
aF1RkcMj8sWG9vHAXcjlGgFfXSN9YLppyXpkuZGm4+gjLB2a3rbQCZVFnxCyG4O
ybjkP8Jw6Udm89bK2ucYFfjdrMyn/nJqRxeNABEBAAG0I1Rlc3QgTm9Qcml2S2V5
IDxub2JvZlIAZlZlXhBzS5vcmc+iQFOBBMBCAA4FiEE4Fmh4IZtMa4TEXCITZou
EzBBU9EFAlsMHecCGwMFCwkIBwIGFQoJCAcCBBYCAwECHgECF4AACgkQTZouEzBB
U9F+qwf/SHj4uRnTWgyJ71FBxQDYCBq3jbi6e7hMkRPbJyJdnPIMAb2p0PJjBgjW
0pp4+kDPZans3UDHbma1u/SFI4/y6isJiK94Bk5xp5YliLGNuUceTjgDFe6lBhfQ1
zVWZC/NF3tPgbziLxXQTNt34nS+9dbV/QFDLW0POcN7C0jR/hgkBJMEH2PezWhSj
mL/yLflUYAoxVpXjfc5aPJKqw0tR7m5ibznjCphE+FUMRg8EOmJcg6soeJ5QspU
k2dPN3+Y0zCTNRgAHEI+yIQbM6pio6v2c+UCtT1QhW4xSI38/kcEG8QiM55r1TUy
FcWAY5n5t1nNZtMxxse3LqEon3rKiLkBDQRbDB3nAQgAqfAjSjengERTM+ZYOWn0
QF2v2FuEuMe8mhju7Met7SN2zGv1LnhjTNshEa9IABEfjZirE2Tqx4xCWDwDedK4
u1ToFvcnuAMnq2O47Sh+eTypsf6WPFtPBWf6ctKY31hFXjgoyDBULBv143XU/D9C
Mt7nsKDPYHVrrnge/qWPYVcb+cO0sSwNImMcwQSdTQ3VBq7MeNS9ZeBcXi+XCjhN
kjNum2AQqpkHHDQV7871yQ8RIILvZSSfkLb0/SNDU+bGaw2G3lcyKdIfZi2EWWZT
oCbH38I+LV7nAEe4zFpHwW8X0Dkx2aLgxe6UszDH9L3eGhTLpJhOSiaanG+zZKm
+QARAQABiQE2BBgBCAAgFiEE4Fmh4IZtMa4TEXCITZouEzBBU9EFAlsMHecCGwwA
CgkQTZouEzBBU9H5TQgAolWvIsez/WW8N2tmZENX0LOFNb+1S4L4X983njwNdoVI
w19pbj+8RIHF/H9kcPGi7jK96gvlykQn3uez/95D2AiRFW5KYdOouFisKgHpv8Ay
BrhclHv11yK+X/OiTD0scYaG7np5162xLkaxSO9hsz2fGv20RKaXCWkI69fWw0BR
XII5pZh2YFei2ZhH/tMIW65h3w0gtgaZBBdpZTOOW4zvghyN+0MSObqkI1BvUJu
caDFI4d6ZTmP5SY+pZyktZ4bg/vMH5VfxdIKgbLx9uVeTvOupvbAW0TNulYGUBQE
nm+S0zr3W18t64e4sS3oHse8zCqo1iiImpba6F1Oaw==
=y6DD
```

-----END PGP PUBLIC KEY BLOCK-----

```
from __future__ import absolute_import
```

```
import cython
```

```
import gpg
```

```
c = gpg.Context()
```

```
seckeys = c.keylist(pattern=None, secret=True)
```

```
pubkeys = c.keylist(pattern=None, secret=False)
```

```
seclist = list(seckeys)
```

```
secnum = len(seclist)
```

```
publist = list(pubkeys)
pubnum = len(publist)

if cython.compiled is True:
    cc = "Powered by Cython compiled C code."
else:
    cc = "Powered by Python."

print("""
    Number of secret keys: {0}
    Number of public keys: {1}

    {2}
    """).format(secnum, pubnum, cc)
This is gpgme.info, produced by makeinfo version 6.3 from gpgme.texi.
```

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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gpgme.info-1: 1689

gpgme.info-2: 301885

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End Tag Table

Local Variables:

coding: utf-8

End:

# -\*- mode: org -\*-

#+TITLE: A Short History of the GPGME bindings for Python

#+LATEX\_COMPILER: xelatex

#+LATEX\_CLASS: article

#+LATEX\_CLASS\_OPTIONS: [12pt]

#+LATEX\_HEADER: \usepackage{xltextra}

```
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
```

\* Overview

:PROPERTIES:

:CUSTOM\_ID: overview

:END:

```
| Version:      | 0.0.1                |
| GPGME Version: | 1.13.0              |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |
| Language:     | Australian English, British English |
| xml:lang:     | en-AU, en-GB, en    |
```

The GPGME Python bindings passed through many hands and numerous phases before, after a fifteen year journey, coming full circle to return to the source. This is a short explanation of that journey.

\*\* In the beginning

:PROPERTIES:

:CUSTOM\_ID: in-the-beginning

:END:

In 2002 John Goerzen released PyME; Python bindings for the GPGME module which utilised the current release of Python of the time and SWIG.<sup>[fn:1]</sup> Shortly after creating it and ensuring it worked he stopped supporting it, though he left his work available on his Gopher site.

\*\* Keeping the flame alive

:PROPERTIES:

:CUSTOM\_ID: keeping-the-flame-alive

:END:

A couple of years later the project was picked up by Igor Belyi and actively developed and maintained by him from 2004 to 2008. Igor's whereabouts at the time of this document's creation are unknown, but the current authors do hope he is well. We're assuming (or hoping) that life did what life does and made continuing untenable.

\*\* Passing the torch

:PROPERTIES:

:CUSTOM\_ID: passing-the-torch

:END:

In 2014 Martin Albrecht wanted to patch a bug in the PyME code and discovered the absence of Igor. Following a discussion on the PyME mailing list he became the new maintainer for PyME, releasing version 0.9.0 in May of that year. He remains the maintainer of the original PyME release in Python 2.6 and 2.7 (available via PyPI).

\*\* Coming full circle

```
:PROPERTIES:  
:CUSTOM_ID: ouroboros  
:END:
```

In 2015 Ben McGinnes approached Martin about a Python 3 version, while investigating how complex a task this would be the task ended up being completed. A subsequent discussion with Werner Koch led to the decision to fold the Python 3 port back into the original GPGME release in the languages subdirectory for non-C bindings under the module name of =pyme3=.

In 2016 this PyME module was integrated back into the GPGME project by Justus Winter. During the course of this work Justus adjusted the port to restore limited support for Python 2, but not as many minor point releases as the original PyME package supports. During the course of this integration the package was renamed to more accurately reflect its status as a component of GPGME. The =pyme3= module was renamed to =gpg= and adopted by the upstream GnuPG team.

In 2017 Justus departed G10code and the GnuPG team. Following this Ben returned to maintain of gpgme Python bindings and continue building them from that point.

\* Relics of the past

```
:PROPERTIES:  
:CUSTOM_ID: relics-past  
:END:
```

There are a few things, in addition to code specific factors, such as SWIG itself, which are worth noting here.

\*\* The Annoyances of Git

```
:PROPERTIES:  
:CUSTOM_ID: the-annoyances-of-git  
:END:
```

As anyone who has ever worked with git knows, submodules are horrible way to deal with pretty much anything. In the interests

of avoiding migraines, that was skipped with addition of the PyME code to GPGME.

Instead the files were added to a subdirectory of the =lang/= directory, along with a copy of the entire git log up to that point as a separate file within the =lang/python/docs/= directory.[fn:2] As the log for PyME is nearly 100KB and the log for GPGME is approximately 1MB, this would cause considerable bloat, as well as some confusion, should the two be merged.

Hence the unfortunate, but necessary, step to simply move the files. A regular repository version has been maintained should it be possible to implement this better in the future.

#### \*\* The Perils of PyPI

```
:PROPERTIES:  
:CUSTOM_ID: the-perils-of-pypi  
:END:
```

The early port of the Python 2 =pyme= module as =pyme3= was never added to PyPI while the focus remained on development and testing during 2015 and early 2016. Later in 2016, however, when Justus completed his major integration work and subsequently renamed the module from =pyme3= to =gpg=, some prior releases were also provided through PyPI.

Since these bindings require a matching release of the GPGME libraries in order to function, it was determined that there was little benefit in also providing a copy through PyPI since anyone obtaining the GPGME source code would obtain the Python bindings source code at the same time. Whereas there was the potential to sew confusion amongst Python users installing the module from PyPI, only to discover that without the relevant C files, header files or SWIG compiled binaries, the Python module did them little good.

There are only two files on PyPI which might turn up in a search for this module or a sample of its content:

1. gpg (1.8.0) - Python bindings for GPGME GnuPG cryptography library
2. pyme (0.9.0) - Python support for GPGME GnuPG cryptography library

#### \*\*\* GPG 180 - Python bindings for GPGME GnuPG cryptography library

```
:PROPERTIES:  
:CUSTOM_ID: pypi-gpgme-180  
:END:
```

This is the most recent version to reach PyPI and is the version

of the official Python bindings which shipped with GPGME 1.8.0. If you have GPGME 1.8.0 installed and /only/ 1.8.0 installed, then it is probably safe to use this copy from PyPI.

As there have been a lot of changes since the release of GPGME 1.8.0, the GnuPG Project recommends not using this version of the module and instead installing the current version of GPGME along with the Python bindings included with that package.

```
*** PyME 090 - Python support for GPGME GnuPG cryptography library
:PROPERTIES:
:CUSTOM_ID: pypi-gpgme-90
:END:
```

This is the last release of the PyME bindings maintained by Martin Albrecht and is only compatible with Python 2, it will not work with Python 3. This is the version of the software from which the port from Python 2 to Python 3 code was made in 2015.

Users of the more recent Python bindings will recognise numerous points of similarity, but also significant differences. It is likely that the more recent official bindings will feel "more pythonic."

For those using Python 2, there is essentially no harm in using this module, but it may lack a number of more recent features added to GPGME.

\* Footnotes

[fn:1] In all likelihood this would have been Python 2.2 or possibly Python 2.3.

[fn:2] The entire PyME git log and other preceding VCS logs are located in the =gpgme/lang/python/docs/old-commits.log= file.  
2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2008-11-08 Moritz <moritz@gnu.org>

\* gpgme.lisp (size-t): Wrong call to defctype: function accepts optional, not keyword argument.

(ssize-t): Likewise.  
(off-t): Likewise.  
(gpgme-data-t, gpgme-ctx-t): Likewise.  
(gpgme-error-t): Likewise.  
(gpgme-error-no-signal-t): Likewise.  
(gpgme-err-code-t): Likewise.  
(gpgme-err-source-t): Likewise.  
(gpgme-sig-notation-t, gpgme-engine-info-t): Likewise.  
(gpgme-subkey-t): Likewise.  
(gpgme-key-sig-t): Likewise.  
(gpgme-user-id-t): Likewise.  
(gpgme-key-t): Likewise.  
(gpgme-data-cbs-t): Likewise.  
(gpgme-invalid-key-t): Likewise.  
(gpgme-op-encrypt-result-t): Likewise.  
(gpgme-recipient-t): Likewise.  
(gpgme-op-decrypt-result-t): Likewise.  
(gpgme-new-signature-t): Likewise.  
(gpgme-op-sign-result-t): Likewise.  
(gpgme-signature-t): Likewise.  
(gpgme-op-verify-result-t): Likewise.  
(gpgme-import-status-t): Likewise.  
(gpgme-op-import-result-t): Likewise.  
(gpgme-op-genkey-result-t): Likewise.  
(gpgme-op-keylist-result-t): Likewise.

2006-07-06 Marcus Brinkmann <marcus@g10code.de>

\* Initial release.

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# HACKING -\*- org -\*-

#+TITLE: Hacking notes for GPGME

#+STARTUP: showall

\* How to contribute

\*\* No more ChangeLog files

Do not modify any of the ChangeLog files in GPGME. Starting on December 1st, 2011 we put change information only in the GIT

commit log, and generate a top-level ChangeLog file from logs at "make dist" time. As such, there are strict requirements on the form of the commit log messages. The old ChangeLog files have all be renamed to ChangeLog-2011

## \*\* Commit log requirements

Your commit log should always start with a one-line summary, the second line should be blank, and the remaining lines are usually ChangeLog-style entries for all affected files. However, it's fine -- even recommended -- to write a few lines of prose describing the change, when the summary and ChangeLog entries don't give enough of the big picture. Omit the leading TABs that you're used to seeing in a "real" ChangeLog file, but keep the maximum line length at 72 or smaller, so that the generated ChangeLog lines, each with its leading TAB, will not exceed 80 columns. If you want to add text which shall not be copied to the ChangeLog, separate it by a line consisting of two dashes at the begin of a line.

Note that ./autogen.sh installs a git hook to do some basic syntax checking on the commit log message.

Typo fixes and documentation updates don't need a ChangeLog entry; thus you would use a commit message like

```
#+begin_example
Fix typo in a comment

--
#+end_example
```

The marker line here is important; without it the first line would appear in the ChangeLog.

If you exceptionally need to have longer lines in a commit log you may do this after this scissor line:

```
#+begin_example
# ----- >8 -----
#+end_example
```

(hash, blank, 24 dashes, blank, scissor, blank, 24 dashes).

Note that such a comment will be removed if the git commit option `--cleanup-scissor=` is used.

## \*\* License policy

GPGME is currently licensed under the LGPLv2.1+ with tools and the manual being under the GPLv3+. We may eventually update to a newer

version of the licenses or a combination of them. It is thus important, that all contributed code allows for an update of the license; for example we can't accept code under the LGPLv2(only).

If you want to contribute code or documentation to GPGME you are asked to assert that the contribution is in accordance to the "GPGME Developer's Certificate of Origin" as found in the file "DCO".

Except for a slight wording change, this DCO is identical to the one used by the Linux kernel. Please take these simple steps:

- Decide which mail address you want to use. Please have your real name in the address and not a pseudonym. Anonymous contributions can only be done if you find a proxy who certifies for you.
- If your employer or school might claim ownership of code written by you; you need to talk to them to make sure that you have the right to contribute under the DCO.
- Send an OpenPGP signed mail to the gnupg-devel@gnupg.org public mailing list from your mail address. Include a copy of the DCO as found in the official master branch. Insert your name and email address into the DCO in the same way you want to use it later.

Example:

```
Signed-off-by: Joe R. Hacker <joe@example.org>
```

If you need it, you may perform simple transformations on the mail address: Replacing "@" by " at " or "." by " dot ".)

- That's it. From now on you only need to add a "Signed-off-by:" line with your name and mail address to the GIT commit message. It is recommended to send the patches using a PGP/MIME signed mail.

#### \*\* Coding standards

Please follow the GNU coding standards. If you are in doubt consult the existing code as an example. Do no re-indent code without a need. If you really need to do it, use a separate commit for such a change.

- C99 syntax should not be used; stick to C90.
- Please do not use C++ `///  
//` style comments.
- Try to fit lines into 80 columns.
- Ignore signed/unsigned pointer mismatches
- No arithmetic on void pointers; cast to `char*` first.

#### \*\* Commit log keywords

- GnuPG-bug-id :: Values are comma or space delimited bug numbers from bug.gnupg.org pertaining to this commit.
- Debian-bug-id :: Same as above but from the Debian bug tracker.
- CVE-id :: CVE id number pertaining to this commit.
- Regression-due-to :: Commit id of the regression fixed by this commit.
- Fixes-commit :: Commit id this commit fixes.
- Reported-by :: Value is a name or mail address of a bug reporter.
- Suggested-by :: Value is a name or mail address of someone how suggested this change.
- Co-authored-by :: Name or mail address of a co-author
- Some-comments-by :: Name or mail address of the author of additional comments (commit log or code).
- Proofread-by :: Sometimes used by translation commits.
- Signed-off-by :: Name or mail address of the developer

\* Debug hints

- Use gpgme-tool for manual tests.
- The envvar GPGME\_DEBUG enables debugging; see debug.[ch] for details.

2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-04-06 Werner Koch <wk@g10code.com>

- \* gpg-error.m4: Update from current libgpg-error repo.

2010-05-07 Werner Koch <wk@g10code.com>

- \* libassuan.m4: Update from libassuan svn.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

- \* libassuan.m4: Fix LIBASSUAN\_VERSION.

2006-06-08 Marcus Brinkmann <marcus@g10code.de>

- \* pth.m4: Add --all to pth-config invocation.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

- \* pth.m4: Fix code generation (required for Max OS X). Submitted by Emanuele Giaquinta <exg@gentoo.org>.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

\* glib-2.0.m4: New file.

2004-12-28 Werner Koch <wk@g10code.com>

\* pth.m4: Changed quoting for use with automake 1.9.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>

\* pth.m4: Disable `_ac_pth_line`, and don't fail if Pth is not found.

\* glibc21.m4: New file.

\* gpg-error.m4: New file.

\* pth.m4: New file.

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Configuration files may go here. Note that config.h.in is auto-generated so that this file is not in git.

```
(11:private-key(3:dsa(1:p129:eC_L&$2,6tx.gh1VirlqI9
,^g3.$DveUvX1'oIj)(1:q21: #UfK2z(tuVG)(1:g128:zu^Rab;qeQQA B?/6/aspfE/
gx!Mr0YY*oMrJc2xWG:.r6)(1:y128:Uf]j^@oEn4j#QrRq" RcEa E/}4C[3A
5+~~.#!+
)W&5d)j)(1:x21:` )))
```

GPGME Developer's Certificate of Origin. Version 1.0

=====

By making a contribution to the GPGME project, I certify that:

- (a) The contribution was created in whole or in part by me and I have the right to submit it under the free software license indicated in the file; or
- (b) The contribution is based upon previous work that, to the best of my knowledge, is covered under an appropriate free software license and I have the right under that license to submit that work with modifications, whether created in whole

or in part by me, under the same free software license  
(unless I am permitted to submit under a different license),  
as indicated in the file; or

(c) The contribution was provided directly to me by some other  
person who certified (a), (b) or (c) and I have not modified  
it.

(d) I understand and agree that this project and the contribution  
are public and that a record of the contribution (including  
all personal information I submit with it, including my  
sign-off) is maintained indefinitely and may be redistributed  
consistent with this project or the free software license(s)  
involved.

Signed-off-by: [Your name and mail address]

```
\input texinfo @c -*- texinfo -*-
```

```
@c %**start of header
```

```
@setfilename gpgme-python-howto.info
```

```
@settitle GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@documentencoding utf-8
```

```
@documentlanguage en
```

```
@c %**end of header
```

```
@finalout
```

```
@titlepage
```

```
@title GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@author Ben McGinnes
```

```
@end titlepage
```

```
@contents
```

```
@ifnottex
```

```
@node Top
```

```
@top GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@end ifnottex
```

```
@menu
```

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* Basic Functions::
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```

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* Advanced or Experimental Use Cases::
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* Miscellaneous extras and work-arounds::
```

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```

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## Difference between the Python bindings and other GnuPG Python packages

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#### Copyright and Licensing

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- \* Draft Editions of this HOWTO::
- \* License GPL compatible::

@end detailmenu

@end menu

@node Introduction

@chapter Introduction

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.1.5  
@item GPGME Version:  
@tab 1.13.0  
@item Author:  
@tab Ben McGinnes <ben@gnupg.org>  
@item Author GPG Key:  
@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D  
@item Language:  
@tab Australian English, British English  
@item Language codes:  
@tab en-AU, en-GB, en  
@end multitable

This document provides basic instruction in how to use the GPGME Python bindings to programmatically leverage the GPGME library.

@menu  
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@node Python 2 versus Python 3  
@section Python 2 versus Python 3

Though the GPGME Python bindings themselves provide support for both Python 2 and 3, the focus is unequivocally on Python 3 and specifically from Python 3.4 and above. As a consequence all the examples and instructions in this guide use Python 3 code.

Much of it will work with Python 2, but much of it also deals with Python 3 byte literals, particularly when reading and writing data. Developers concentrating on Python 2.7, and possibly even 2.6, will need to make the appropriate modifications to support the older string and unicode types as opposed to bytes.

There are multiple reasons for concentrating on Python 3; some of which relate to the immediate integration of these bindings, some of which relate to longer term plans for both GPGME and the python bindings and some of which relate to the impending EOL period for Python 2.7. Essentially, though, there is little value in tying the bindings to a version of the language which is a dead end and the advantages offered by Python 3 over Python 2 make handling the data types with which GPGME deals considerably easier.

@node Examples  
@section Examples

All of the examples found in this document can be found as Python 3 scripts in the `@samp{lang/python/examples/howto}` directory.

@node Unofficial Drafts  
@section Unofficial Drafts

In addition to shipping with each release of GPGME, there is a section on locations to read or download `@ref{Draft Editions of this HOWTO, , draft editions}` of this document from at the end of it. These are unofficial versions produced in between major releases.

@node What's New  
@section What's New

Full details of what is new are now available in the `@uref{what-is-new.org, What's New}` file and archives of the preceding `@emph{What's New}` sections are available in the `@uref{what-was-new, What Was New}` file.

@menu  
\* New in GPGME 1130::  
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@end menu

@node New in GPGME 1130  
@subsection New in GPGME 1130

See the `@uref{what-is-new#new-stuff-1-13-0, What's New}` document for what is new in version 1.13.0.

@node New in GPGME 1120  
@subsection New in GPGME 1120

See the `@uref{what-was-new#new-stuff-1-12-0, What Was New}` document for what was new in version 1.12.0.

@node GPGME Concepts  
@chapter GPGME Concepts

@menu  
\* A C API::  
\* Python bindings::  
\* Difference between the Python bindings and other GnuPG Python packages::  
@end menu

@node A C API  
@section A C API

Unlike many modern APIs with which programmers will be more familiar with these days, the GPGME API is a C API. The API is intended for

use by C coders who would be able to access its features by including the @samp{gpgme.h} header file with their own C source code and then access its functions just as they would any other C headers.

This is a very effective method of gaining complete access to the API and in the most efficient manner possible. It does, however, have the drawback that it cannot be directly used by other languages without some means of providing an interface to those languages. This is where the need for bindings in various languages stems.

@node Python bindings  
@section Python bindings

The Python bindings for GPGME provide a higher level means of accessing the complete feature set of GPGME itself. It also provides a more pythonic means of calling these API functions.

The bindings are generated dynamically with SWIG and the copy of @samp{gpgme.h} generated when GPGME is compiled.

This means that a version of the Python bindings is fundamentally tied to the exact same version of GPGME used to generate that copy of @samp{gpgme.h}.

@node Difference between the Python bindings and other GnuPG Python packages  
@section Difference between the Python bindings and other GnuPG Python packages

There have been numerous attempts to add GnuPG support to Python over the years. Some of the most well known are listed here, along with what differentiates them.

@menu  
\* The python-gnupg package maintained by Vinay Sajip::  
\* The gnupg package created and maintained by Isis Lovecruft::  
\* The PyME package maintained by Martin Albrecht::  
@end menu

@node The python-gnupg package maintained by Vinay Sajip  
@subsection The python-gnupg package maintained by Vinay Sajip

This is arguably the most popular means of integrating GPG with Python. The package utilises the @samp{subprocess} module to implement wrappers for the @samp{gpg} and @samp{gpg2} executables normally invoked on the command line (@samp{gpg.exe} and @samp{gpg2.exe} on Windows).

The popularity of this package stemmed from its ease of use and capability in providing the most commonly required features.

Unfortunately it has been beset by a number of security issues in the past; most of which stemmed from using unsafe methods of accessing the command line via the `@samp{subprocess}` calls. While some effort has been made over the last two to three years (as of 2018) to mitigate this, particularly by no longer providing shell access through those subprocess calls, the wrapper is still somewhat limited in the scope of its GnuPG features coverage.

The `python-gnupg` package is available under the MIT license.

`@node` The `gnupg` package created and maintained by Isis Lovecruft

`@subsection` The `gnupg` package created and maintained by Isis Lovecruft

In 2015 Isis Lovecruft from the Tor Project forked and then re-implemented the `python-gnupg` package as just `gnupg`. This new package also relied on `subprocess` to call the `@samp{gpg}` or `@samp{gpg2}` binaries, but did so somewhat more securely.

The naming and version numbering selected for this package, however, resulted in conflicts with the original `python-gnupg` and since its functions were called in a different manner to `python-gnupg`, the release of this package also resulted in a great deal of consternation when people installed what they thought was an upgrade that subsequently broke the code relying on it.

The `gnupg` package is available under the GNU General Public License version 3.0 (or any later version).

`@node` The `PyME` package maintained by Martin Albrecht

`@subsection` The `PyME` package maintained by Martin Albrecht

This package is the origin of these bindings, though they are somewhat different now. For details of when and how the `PyME` package was folded back into `GPGME` itself see the `@uref{short-history.org, Short History}` document.`@footnote{ @samp{short-history}` and/or `@samp{short-history.html}`.)

The `PyME` package was first released in 2002 and was also the first attempt to implement a low level binding to `GPGME`. In doing so it provided access to considerably more functionality than either the `@samp{python-gnupg}` or `@samp{gnupg}` packages.

The `PyME` package is only available for Python 2.6 and 2.7.

Porting the `PyME` package to Python 3.4 in 2015 is what resulted in it being folded into the `GPGME` project and the current bindings are the end result of that effort.

The `PyME` package is available under the same dual licensing as `GPGME`

itself: the GNU General Public License version 2.0 (or any later version) and the GNU Lesser General Public License version 2.1 (or any later version).

@node GPGME Python bindings installation  
@chapter GPGME Python bindings installation

@menu  
\* No PyPI::  
\* Requirements::  
\* Installation::  
\* Known Issues::  
@end menu

@node No PyPI  
@section No PyPI

Most third-party Python packages and modules are available and distributed through the Python Package Installer, known as PyPI.

Due to the nature of what these bindings are and how they work, it is infeasible to install the GPGME Python bindings in the same way.

This is because the bindings use SWIG to dynamically generate C bindings against @samp{gpgme.h} and @samp{gpgme.h} is generated from @samp{gpgme.h.in} at compile time when GPGME is built from source. Thus to include a package in PyPI which actually built correctly would require either statically built libraries for every architecture bundled with it or a full implementation of C for each architecture.

See the additional notes regarding @ref{CFFI is the Best and GPGME should use it instead of SWIG, , CFFI and SWIG} at the end of this section for further details.

@node Requirements  
@section Requirements

The GPGME Python bindings only have three requirements:

@enumerate  
@item  
A suitable version of Python 2 or Python 3. With Python 2 that means CPython 2.7 and with Python 3 that means CPython 3.4 or higher.  
@item  
@uref{https://www.swig.org, SWIG}.  
@item  
GPGME itself. Which also means that all of GPGME's dependencies

must be installed too.

@end enumerate

@menu

\* Recommended Additions::

@end menu

@node Recommended Additions

@subsection Recommended Additions

Though none of the following are absolute requirements, they are all recommended for use with the Python bindings. In some cases these recommendations refer to which version(s) of CPython to use the bindings with, while others refer to third party modules which provide a significant advantage in some way.

@enumerate

@item

If possible, use Python 3 instead of 2.

@item

Favour a more recent version of Python since even 3.4 is due to reach EOL soon. In production systems and services, Python 3.6 should be robust enough to be relied on.

@item

If possible add the following Python modules which are not part of the standard library: @uref{http://docs.python-requests.org/en/latest/index.html, Requests}, @uref{https://cython.org/, Cython}, @uref{https://pendulum.eustace.io/, Pendulum} and @uref{https://github.com/Selfnet/hkp4py, hkp4py}.

@end enumerate

Chances are quite high that at least the first one and maybe two of those will already be installed.

Note that, as with Cython, some of advanced use case scenarios will bring with them additional requirements. Most of these will be fairly well known and commonly installed ones, however, which are in many cases likely to have already been installed on many systems or be familiar to Python programmers.

@node Installation

@section Installation

Installing the Python bindings is effectively achieved by compiling and installing GPGME itself.

Once SWIG is installed with Python and all the dependencies for GPGME are installed you only need to confirm that the version(s) of Python you want the bindings installed for are in your @samp{\$PATH}.

By default GPGME will attempt to install the bindings for the most recent or highest version number of Python 2 and Python 3 it detects in `@samp{$PATH}`. It specifically checks for the `@samp{python}` and `@samp{python3}` executables first and then checks for specific version numbers.

For Python 2 it checks for these executables in this order: `@samp{python}`, `@samp{python2}` and `@samp{python2.7}`.

For Python 3 it checks for these executables in this order: `@samp{python3}`, `@samp{python3.7}`, `@samp{python3.6}`, `@samp{python3.5}` and `@samp{python3.4}`.@footnote{With no issues reported specific to Python 3.7, the release of Python 3.7.1 at around the same time as GPGME 1.12.0 and the testing with Python 3.7.1rc1, there is no reason to delay moving 3.7 ahead of 3.6 now. Production environments with more conservative requirements will always enforce their own policies anyway and installation to each supported minor release is quite possible too.}

On systems where `@samp{python}` is actually `@samp{python3}` and not `@samp{python2}` it may be possible that `@samp{python2}` may be overlooked, but there have been no reports of that actually occurring as yet.

In the three months or so since the release of Python 3.7.0 there has been extensive testing and work with these bindings with no issues specifically relating to the new version of Python or any of the new features of either the language or the bindings. This has also been the case with Python 3.7.1rc1. With that in mind and given the release of Python 3.7.1 is scheduled for around the same time as GPGME 1.12.0, the order of preferred Python versions has been changed to move Python 3.7 ahead of Python 3.6.

@menu

\* Installing GPGME::

@end menu

@node Installing GPGME

@subsection Installing GPGME

See the GPGME `@samp{README}` file for details of how to install GPGME from source.

@node Known Issues

@section Known Issues

There are a few known issues with the current build process and the Python bindings. For the most part these are easily addressed should they be encountered.

```
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* Won't Work With Windows::
* CFFI is the Best and GPGME should use it instead of SWIG::
* Virtualised Environments::
* Post installation::
@end menu
```

```
@node Breaking Builds
@subsection Breaking Builds
```

Occasionally when installing GPGME with the Python bindings included it may be observed that the `@samp{make}` portion of that process induces a large very number of warnings and, eventually errors which end that part of the build process. Yet following that with `@samp{make check}` and `@samp{make install}` appears to work seamlessly.

The cause of this is related to the way SWIG needs to be called to dynamically generate the C bindings for GPGME in the first place. So the entire process will always produce `@samp{lang/python/python2-gpg/}` and `@samp{lang/python/python3-gpg/}` directories. These should contain the build output generated during compilation, including the complete bindings and module installed into `@samp{site-packages}`.

Occasionally the errors in the early part or some other conflict (e.g. not installing as `@strong{@emph{root}}` or `@strong{@emph{su}}`) may result in nothing being installed to the relevant `@samp{site-packages}` directory and the build directory missing a lot of expected files. Even when this occurs, the solution is actually quite simple and will always work.

That solution is simply to run the following commands as either the `@strong{root}` user or prepended with `@samp{sudo -H}` `@footnote{Yes, even if you use virtualenv with everything you do in Python. If you want to install this module as just your user account then you will need to manually configure, compile and install the @emph{entire} GnuPG stack as that user as well. This includes libraries which are not often installed that way. It can be done and there are circumstances under which it is worthwhile, but generally only on POSIX systems which utilise single user mode (some even require it).}` in the `@samp{lang/python/}` directory:

```
@example
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py install
@end example
```

Yes, the build command does need to be run twice. Yes, you still need to run the potentially failing or incomplete steps during the `@samp{configure}`, `@samp{make}` and `@samp{make install}` steps with installing GPGME. This is because those steps generate a lot of essential files needed, both by and in order to create, the bindings (including both the `@samp{setup.py}` and `@samp{gpgme.h}` files).

@enumerate

@item

IMPORTANT Note

If specifying a selected number of languages to create bindings for, try to leave Python last. Currently the majority of the other language bindings are also preceding Python of either version when listed alphabetically (not counting the Qt bindings).

If Python is set to precede one of the other languages then it is possible that the errors described here may interrupt the build process before generating bindings for those other languages. In these cases it may be preferable to configure all preferred language bindings separately with alternative `@samp{configure}` steps for GPGME using the `@samp{--enable-languages=$LANGUAGE}` option.

Alternatively `@samp{make}` (or `@samp{gmake}`, depending on your platform) may be run with the `@samp{-k}` option, which tells make to keep going even if errors are encountered. In that case the failure of one language's set of bindings to build should not hamper another language's bindings to build.

@end enumerate

@node Reinstalling Responsibly

@subsection Reinstalling Responsibly

Regardless of whether you're installing for one version of Python or several, there will come a point where reinstallation is required. With most Python module installations, the installed files go into the relevant site-packages directory and are then forgotten about. Then the module is upgraded, the new files are copied over the old and that's the end of the matter.

While the same is true of these bindings, there have been intermittent issues observed on some platforms which have benefited significantly from removing all the previous installations of the bindings before installing the updated versions.

Removing the previous version(s) is simply a matter of changing to the

relevant @samp{site-packages} directory for the version of Python in question and removing the @samp{gpg/} directory and any accompanying egg-info files for that module.

In most cases this will require root or administration privileges on the system, but the same is true of installing the module in the first place.

@node Multiple installations  
@subsection Multiple installations

For a variety of reasons it may be either necessary or just preferable to install the bindings to alternative installed Python versions which meet the requirements of these bindings.

On POSIX systems this will generally be most simply achieved by running the manual installation commands (build, build, install) as described in the previous section for each Python installation the bindings need to be installed to.

As per the SWIG documentation: the compilers, libraries and runtime used to build GPGME and the Python Bindings @strong{must} match those used to compile Python itself, including the version number(s) (at least going by major version numbers and probably minor numbers too).

On most POSIX systems, including OS X, this will very likely be the case in most, if not all, cases.

Note that from GPGME @uref{https://dev.gnupg.org/rMff6ff616aea6f59b7f2ce1176492850ecdf3851e, 1.12.1} the default installation installs to each version of Python it can find first. That is that it will currently install for the first copies of Python versions 2.7, 3.4, 3.5, 3.6, 3.7 and 3.8 (dev branch) that it finds. Usually this will be in the same prefix as GPGME itself, but is dictated by the @samp{\$PATH} when the installation is performed. The above instructions can still be performed on other python installations which the installer does not find, including alternative prefixes.

@node Won't Work With Windows  
@subsection Won't Work With Windows

There are semi-regular reports of Windows users having considerable difficulty in installing and using the Python bindings at all. Very often, possibly even always, these reports come from Cygwin users and/or MinGW users and/or Msys2 users. Though not all of them have been confirmed, it appears that these reports have also come from people who installed Python using the Windows installer files from the @uref{https://python.org, Python website} (i.e. mostly MSI installers, sometimes self-extracting

@samp{.exe} files).

The Windows versions of Python are not built using Cygwin, MinGW or Msys2; they're built using Microsoft Visual Studio. Furthermore the version used is @emph{considerably} more advanced than the version which MinGW obtained a small number of files from many years ago in order to be able to compile anything at all. Not only that, but there are changes to the version of Visual Studio between some micro releases, though that is particularly the case with Python 2.7, since it has been kept around far longer than it should have been.

There are two theoretical solutions to this issue:

@enumerate

@item

Compile and install the GnuPG stack, including GPGME and the Python bindings using the same version of Microsoft Visual Studio used by the Python Foundation to compile the version of Python installed.

If there are multiple versions of Python then this will need to be done with each different version of Visual Studio used for those versions of Python.

@item

Compile and install Python using the same tools used by choice, such as MinGW or Msys2.

@end enumerate

Do @strong{not} use the official Windows installer for Python unless following the first method.

In this type of situation it may even be for the best to accept that there are less limitations on permissive software than free software and simply opt to use a recent version of the Community Edition of Microsoft Visual Studio to compile and build all of it, no matter what.

Investigations into the extent or the limitations of this issue are ongoing.

The following table lists the version of Microsoft Visual Studio which needs to be used when compiling GPGME and the Python bindings with each version of the CPython binary released @uref{https://www.python.org/downloads/windows/, for Windows}:

@multitable {aaaaaaa} {aaaaaaaaaaaaaaaaaaaaa} {aaaaaaaaaaaaaaaaaaaaa}

@item CPython

@tab Microsoft product name

@tab runtime filename  
@item 2.7.6  
@tab Visual Studio 2008  
@tab MSVCR90.DLL  
@item 3.4.0  
@tab Visual Studio 2010  
@tab MSVCR100.DLL  
@item 3.5.0  
@tab Visual Studio 2015  
@tab @strong{see below}  
@item 3.6.0  
@tab Visual Studio 2015  
@tab @strong{see below}  
@item 3.7.0  
@tab Visual Studio 2017\*  
@tab @strong{see below}  
@end multitable

It is important to note that MingW and Msys2 ship with the Visual C runtime from Microsoft Visual Studio 2005 and are thus @strong{incompatible} with all the versions of CPython which can be used with the GPGME Python bindings.

It is also important to note that from CPython 3.5 onwards, the Python Foundation has adopted the reworking of the Visual C runtime which was performed for Visual Studio 2015 and aimed at resolving many of these kinds of issues. Much greater detail on these issues and the correct file(s) to link to are available from Matthew Brett's invaluable page, @uref{https://matthew-brett.github.io/pydagogue/python\_msvc.html, Using Microsoft Visual C with Python}. It is also worth reading the Microsoft Developer Network blog post on @uref{http://blogs.msdn.com/b/vcblog/archive/2015/03/03/introducing-the-universal-crt.aspx, the universal CRT} and Steve Dower's blog posts on Python extensions (@uref{http://stevedower.id.au/blog/building-for-python-3-5, part 1} and @uref{http://stevedower.id.au/blog/building-for-python-3-5-part-two, part 2}).

The second of those two posts by Steve Dower contains the details of specific configuration options required for compiling anything to be used with official CPython releases. In addition to those configuration and compiler settings to use, the versions of Visual Studio prior to Visual Studio 2015 did not support 64-bit systems by default. So compiling a 64-bit version of these bindings for a 64-bit version of CPython 2.7 or 3.4 requires additional work.

In addition to the blog posts, the @uref{https://wiki.python.org/moin/WindowsCompilers, Windows compilers} wiki page on the CPython wiki is another essential reference on the relevant versions of Visual Studio to use and the degree of compatibility with CPython releases.

Eventually someone will ask why there isn't an installable binary for Windows, which the GPGME of the licenses do not preclude as long as the source code is available in conjunction with such a release.

The sheer number of versions of Visual Studio in conjunction with differing configuration options depending on the target Windows version and whether the architecture is 64-bit or 32-bit makes it difficult to provide a correct binary installer for Windows users. At the bare minimum doing so would require the GnuPG project compile ten different versions of the bindings with each release; both 32-bit and 64-bit versions for CPython 2.7 and 3.4, with 64-bit versions for both x86-64 (i.e. Intel and AMD) and ARM architectures for CPython 3.5, 3.6, 3.7 and later releases. That's the bare @strong{ minimum}, it'd probably be higher.

Additionally, with only a binary installation used in conjunction with the CPython installer from @samp{python.org} the advanced options available which utilise @ref{C plus Python plus SWIG plus Cython, , Cython} will not be able to be used at all. Cython depends on being able to compile the C code it generates and that too would need to utilise a matching runtime to both the installed version of CPython and these bindings in order to work with the bindings.

Considering all of that, what do we recommend?

@enumerate

@item

Use a recent version of CPython; at least 3.5, but ideally 3.6 or later.

@item

Use Visual Studio 2015 or the standalone build tools for Visual Studio 2017 (or later).

@item

Compile both CPython and GPGME with these bindings using the tools selected in step 2.

@item

Ignore MingW, Msys2 and the official CPython binary installers.

@item

Be thankful the answer to this question wasn't simply to say something like, install Linux or install FreeBSD (or even Apple's OS X).

@end enumerate

@node CFFI is the Best and GPGME should use it instead of SWIG

@subsection CFFI is the Best and GPGME should use it instead of SWIG

There are many reasons for favouring @uref{https://cffi.readthedocs.io/en/latest/overview.html, CFFI} and proponents of it are quite happy to repeat these things as if all it would take to switch from SWIG to CFFI is repeating that list as if it were a new concept.

The fact is that there are things which Python's CFFI implementation cannot handle in the GPGME C code. Beyond that there are features of SWIG which are simply not available with CFFI at all. SWIG generates the bindings to Python using the @samp{gpgme.h} file, but that file is not a single version shipped with each release, it too is generated when GPGME is compiled.

CFFI is currently unable to adapt to such a potentially mutable codebase. If there were some means of applying SWIG's dynamic code generation to produce the Python/CFFI API modes of accessing the GPGME libraries (or the source source code directly), but such a thing does not exist yet either and it currently appears that work is needed in at least one of CFFI's dependencies before any of this can be addressed.

So if you're a massive fan of CFFI; that's great, but if you want this project to switch to CFFI then rather than just insisting that it should, I'd suggest you volunteer to bring CFFI up to the level this project needs.

If you're actually seriously considering doing so, then I'd suggest taking the @samp{gpgme-tool.c} file in the GPGME @samp{src/} directory and getting that to work with any of the CFFI API methods (not the ABI methods, they'll work with pretty much anything). When you start running into trouble with "ifdefs" then you'll know what sort of things are lacking. That doesn't even take into account the amount of work saved via SWIG's code generation techniques either.

@node Virtualised Environments

@subsection Virtualised Environments

It is fairly common practice amongst Python developers to, as much as possible, use packages like virtualenv to keep various things that are to be installed from interfering with each other. Given how much of the GPGME bindings is often at odds with the usual pythonic way of doing things, it stands to reason that this would be called into question too.

As it happens the answer as to whether or not the bindings can be used with virtualenv, the answer is both yes and no.

In general we recommend installing to the relevant path and matching prefix of GPGME itself. Which means that when GPGME, and ideally the rest of the GnuPG stack, is installed to a prefix like `@samp{/usr/local}` or `@samp{/opt/local}` then the bindings would need to be installed to the main Python installation and not a virtualised abstraction. Attempts to separate the two in the past have been known to cause weird and intermittent errors ranging from minor annoyances to complete failures in the build process.

As a consequence we only recommend building with and installing to the main Python installations within the same prefix as GPGME is installed to or which are found by GPGME's configuration stage immediately prior to running the make commands. Which is exactly what the compiling and installing process of GPGME does by default.

Once that is done, however, it appears that a copy of the compiled module may be installed into a virtualenv of the same major and minor version matching the build. Alternatively it is possible to utilise a `@samp{sites.pth}` file in the `@samp{site-packages/}` directory of a virtualenv installation, which links back to the system installations corresponding directory in order to import anything installed system wide. This may or may not be appropriate on a case by case basis.

Though extensive testing of either of these options is not yet complete, preliminary testing of them indicates that both are viable as long as the main installation is complete. Which means that certain other options normally restricted to virtual environments are also available, including integration with pythonic test suites (e.g. [@uref{https://docs.pytest.org/en/latest/index.html}](https://docs.pytest.org/en/latest/index.html), `pytest`) and other large projects.

That said, it is worth reiterating the warning regarding non-standard installations. If one were to attempt to install the bindings only to a virtual environment without somehow also including the full GnuPG stack (or enough of it as to include GPGME) then it is highly likely that errors would be encountered at some point and more than a little likely that the build process itself would break.

If a degree of separation from the main operating system is still required in spite of these warnings, then consider other forms of virtualisation. Either a virtual machine (e.g. [@uref{https://www.virtualbox.org/}](https://www.virtualbox.org/), `VirtualBox`), a hardware emulation layer (e.g. [@uref{https://www.qemu.org/}](https://www.qemu.org/), `QEMU`) or an application container (e.g. [@uref{https://www.docker.com/why-docker}](https://www.docker.com/why-docker), `Docker`).

Finally it should be noted that the limited tests conducted thus far have been using the `@samp{virtualenv}` command in a new directory to create the virtual python environment. As opposed to the standard `@samp{python3 -m venv}` and it is possible that this will make a difference depending on the system and version of Python in use. Another option is to run

the command `@samp{python3 -m virtualenv /path/to/install/virtual/thingy}` instead.

@node Post installation

@subsection Post installation

Following installation it is recommended to move the

`@samp{post_installer.py}` script from the `@samp{lang/python/examples/howto/}` directory to the `@samp{lang/python/}` directory and run it. This will fix or restore files needed by Sphinx which may be removed during a distribution build for release. It will also generate reST files from Org mode files with Pandoc and generate Texinfo files from Org mode files with GNU Emacs and Org mode (in batch mode). Additionally it will fix the UTF-8 declaration line in the Texinfo files (Emacs expects "UTF-8" to be "utf-8").

@node Fundamentals

@chapter Fundamentals

Before we can get to the fun stuff, there are a few matters regarding GPGME's design which hold true whether you're dealing with the C code directly or these Python bindings.

@menu

\* No REST::

\* Context::

@end menu

@node No REST

@section No REST

The first part of which is or will be fairly blatantly obvious upon viewing the first example, but it's worth reiterating anyway. That being that this API is `@emph{@strong{not}}` a REST API. Nor indeed could it ever be one.

Most, if not all, Python programmers (and not just Python programmers) know how easy it is to work with a RESTful API. In fact they've become so popular that many other APIs attempt to emulate REST-like behaviour as much as they are able. Right down to the use of JSON formatted output to facilitate the use of their API without having to retrain developers.

This API does not do that. It would not be able to do that and also provide access to the entire C API on which it's built. It does, however, provide a very pythonic interface on top of the direct bindings and it's this pythonic layer that this HOWTO deals with.

@node Context  
@section Context

One of the reasons which prevents this API from being RESTful is that most operations require more than one instruction to the API to perform the task. Sure, there are certain functions which can be performed simultaneously, particularly if the result known or strongly anticipated (e.g. selecting and encrypting to a key known to be in the public keybox).

There are many more, however, which cannot be manipulated so readily: they must be performed in a specific sequence and the result of one operation has a direct bearing on the outcome of subsequent operations. Not merely by generating an error either.

When dealing with this type of persistent state on the web, full of both the RESTful and REST-like, it's most commonly referred to as a session. In GPGME, however, it is called a context and every operation type has one.

@node Working with keys  
@chapter Working with keys

@menu  
\* Key selection::  
\* Get key::  
\* Importing keys::  
\* Exporting keys::  
@end menu

@node Key selection  
@section Key selection

Selecting keys to encrypt to or to sign with will be a common occurrence when working with GPGMe and the means available for doing so are quite simple.

They do depend on utilising a Context; however once the data is recorded in another variable, that Context does not need to be the same one which subsequent operations are performed.

The easiest way to select a specific key is by searching for that key's key ID or fingerprint, preferably the full fingerprint without any spaces in it. A long key ID will probably be okay, but is not advised and short key IDs are already a problem with some being generated to match specific patterns. It does not matter whether the pattern is upper or lower case.

So this is the best method:

```
@example
import gpg

k = gpg.Context().keylist(pattern="258E88DCBD3CD44D8E7AB43F6ECB6AF0DEADBEEF")
keys = list(k)
@end example
```

This is passable and very likely to be common:

```
@example
import gpg

k = gpg.Context().keylist(pattern="0x6ECB6AF0DEADBEEF")
keys = list(k)
@end example
```

And this is a really bad idea:

```
@example
import gpg

k = gpg.Context().keylist(pattern="0xDEADBEEF")
keys = list(k)
@end example
```

Alternatively it may be that the intention is to create a list of keys which all match a particular search string. For instance all the addresses at a particular domain, like this:

```
@example
import gpg

ncsc = gpg.Context().keylist(pattern="ncsc.mil")
nsa = list(ncsc)
@end example
```

```
@menu
* Counting keys::
@end menu
```

```
@node Counting keys
@subsection Counting keys
```

Counting the number of keys in your public keybox (@samp{pubring.kbx}), the format which has superseded the old keyring format (@samp{pubring.gpg} and @samp{secring.gpg}), or the number of secret keys is a very simple task.

```

@example
import gpg

c = gpg.Context()
seckeys = c.keylist(pattern=None, secret=True)
pubkeys = c.keylist(pattern=None, secret=False)

seclist = list(seckeys)
secnum = len(seclist)

publist = list(pubkeys)
pubnum = len(publist)

print("""
Number of secret keys: @ {0@ }
Number of public keys: @ {1@ }
""".format(secnum, pubnum))
@end example

```

NOTE: The [@ref{C plus Python plus SWIG plus Cython, , Cython}](#) introduction in the [@ref{Advanced or Experimental Use Cases, , Advanced and Experimental}](#) section uses this same key counting code with Cython to demonstrate some areas where Cython can improve performance even with the bindings. Users with large public keyrings or keyboxes, for instance, should consider these options if they are comfortable with using Cython.

```

@node Get key
@section Get key

```

An alternative method of getting a single key via its fingerprint is available directly within a Context with `@samp{Context().get_key}`. This is the preferred method of selecting a key in order to modify it, sign or certify it and for obtaining relevant data about a single key as a part of other functions; when verifying a signature made by that key, for instance.

By default this method will select public keys, but it can select secret keys as well.

This first example demonstrates selecting the current key of Werner Koch, which is due to expire at the end of 2018:

```

@example
import gpg

fingerprint = "80615870F5BAD690333686D0F2AD85AC1E42B367"

```

```
key = gpg.Context().get_key(fingerprint)
@end example
```

Whereas this example demonstrates selecting the author's current key with the `@samp{secret}` key word argument set to `@samp{True}`:

```
@example
import gpg

fingerprint = "DB4724E6FA4286C92B4E55C4321E4E2373590E5D"
key = gpg.Context().get_key(fingerprint, secret=True)
@end example
```

It is, of course, quite possible to select expired, disabled and revoked keys with this function, but only to effectively display information about those keys.

It is also possible to use both unicode or string literals and byte literals with the fingerprint when getting a key in this way.

```
@node Importing keys
@section Importing keys
```

Importing keys is possible with the `@samp{key_import()}` method and takes one argument which is a bytes literal object containing either the binary or ASCII armoured key data for one or more keys.

The following example retrieves one or more keys from the SKS keyserver via the web using the requests module. Since requests returns the content as a bytes literal object, we can then use that directly to import the resulting data into our keybox.

```
@example
import gpg
import os.path
import requests

c = gpg.Context()
url = "https://sks-keyserver.net/pks/lookup"
pattern = input("Enter the pattern to search for key or user IDs: ")
payload = @{"op": "get", "search": pattern@ }

r = requests.get(url, verify=True, params=payload)
result = c.key_import(r.content)

if result is not None and hasattr(result, "considered") is False:
    print(result)
elif result is not None and hasattr(result, "considered") is True:
```

```
num_keys = len(result.imports)
new_revs = result.new_revocations
new_sigs = result.new_signatures
new_subs = result.new_sub_keys
new_uids = result.new_user_ids
new_scr = result.secret_imported
nochange = result.unchanged
print("""
The total number of keys considered for import was: @ {0@ }
```

```
    Number of keys revoked: @ {1@ }
    Number of new signatures: @ {2@ }
    Number of new subkeys: @ {3@ }
    Number of new user IDs: @ {4@ }
    Number of new secret keys: @ {5@ }
    Number of unchanged keys: @ {6@ }
```

```
The key IDs for all considered keys were:
""".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scr,
           nochange))
for i in range(num_keys):
    print("@ {0@ }\n".format(result.imports[i].fpr))
else:
    pass
@end example
```

NOTE: When searching for a key ID of any length or a fingerprint (without spaces), the SKS servers require the the leading @samp{0x} indicative of hexadecimal be included. Also note that the old short key IDs (e.g. @samp{0xDEADBEEF}) should no longer be used due to the relative ease by which such key IDs can be reproduced, as demonstrated by the Evil32 Project in 2014 (which was subsequently exploited in 2016).

Testing for whether a string in any given search is or may be a hexadecimal value which may be missing the leading @samp{0x} is a simple matter of using a try/except statement which attempts to convert the string as hex to an integer and then back to hex; then using that to search with. Raising a ValueError simply results in treating the string as a string. This is the method and logic utilised in the @samp{import-keys-hkp.py} script (see below).

```
@menu
* Working with ProtonMail::
* Importing with HKP for Python::
* Importing from ProtonMail with HKP for Python::
@end menu
```

@node Working with ProtonMail

@subsection Working with ProtonMail

Here is a variation on the example above which checks the constrained ProtonMail keyserver for ProtonMail public keys.

@example

```
import gpg
```

```
import requests
```

```
import sys
```

```
print("""
```

```
This script searches the ProtonMail key server for the specified key and imports it.
```

```
""")
```

```
c = gpg.Context(armor=True)
```

```
url = "https://api.protonmail.ch/pks/lookup"
```

```
ksearch = []
```

```
if len(sys.argv) >= 2:
```

```
    keyterm = sys.argv[1]
```

```
else:
```

```
    keyterm = input("Enter the key ID, UID or search string: ")
```

```
if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
```

```
    ksearch.append(keyterm[1:])
```

```
    ksearch.append(keyterm[1:])
```

```
    ksearch.append(keyterm[1:])
```

```
elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
```

```
    ksearch.append("@{0@}@protonmail.com".format(keyterm[1:]))
```

```
    ksearch.append("@{0@}@protonmail.ch".format(keyterm[1:]))
```

```
    ksearch.append("@{0@}@pm.me".format(keyterm[1:]))
```

```
elif keyterm.count("@@") == 0:
```

```
    ksearch.append("@{0@}@protonmail.com".format(keyterm))
```

```
    ksearch.append("@{0@}@protonmail.ch".format(keyterm))
```

```
    ksearch.append("@{0@}@pm.me".format(keyterm))
```

```
elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
```

```
    uidlist = keyterm.split("@@")
```

```
    for uid in uidlist:
```

```
        ksearch.append("@{0@}@protonmail.com".format(uid))
```

```
        ksearch.append("@{0@}@protonmail.ch".format(uid))
```

```
        ksearch.append("@{0@}@pm.me".format(uid))
```

```
elif keyterm.count("@@") > 2:
```

```
    uidlist = keyterm.split("@@")
```

```
    for uid in uidlist:
```

```
        ksearch.append("@{0@}@protonmail.com".format(uid))
```

```
        ksearch.append("@{0@}@protonmail.ch".format(uid))
```

```

        ksearch.append("@{0@}@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    payload = @{"op": "get", "search": k@}
    try:
        r = requests.get(url, verify=True, params=payload)
        if r.ok is True:
            result = c.key_import(r.content)
        elif r.ok is False:
            result = r.content
    except Exception as e:
        result = None

    if result is not None and hasattr(result, "considered") is False:
        print("@{0@} for @{1@}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: @{0@}

With UIDs wholly or partially matching the following string:

    @{1@}

Number of keys revoked: @{2@}
Number of new signatures: @{3@}
    Number of new subkeys: @{4@}
    Number of new user IDs: @{5@}
Number of new secret keys: @{6@}
Number of unchanged keys: @{7@}

The key IDs for all considered keys were:
""").format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
            nochange))
        for i in range(num_keys):
            print(result.imports[i].fpr)
        print("")
    elif result is None:
        print(e)
@end example

```

Both the above example, [@uref{../examples/howto/pmkey-import.py, pmkey-import.py}](https://github.com/ProtonMail/pmkey-import.py), and a version which prompts for an alternative GnuPG home directory, [@uref{../examples/howto/pmkey-import-alt.py, pmkey-import-alt.py}](https://github.com/ProtonMail/pmkey-import-alt.py), are available with the other examples and are executable scripts.

Note that while the ProtonMail servers are based on the SKS servers, their server is related more to their API and is not feature complete by comparison to the servers in the SKS pool. One notable difference being that the ProtonMail server does not permit non ProtonMail users to update their own keys, which could be a vector for attacking ProtonMail users who may not receive a key's revocation if it had been compromised.

@node Importing with HKP for Python

@subsection Importing with HKP for Python

Performing the same tasks with the [@uref{https://github.com/Selfnet/hkp4py, hkp4py module}](https://github.com/Selfnet/hkp4py) (available via PyPI) is not too much different, but does provide a number of options of benefit to end users. Not least of which being the ability to perform some checks on a key before importing it or not. For instance it may be the policy of a site or project to only import keys which have not been revoked. The hkp4py module permits such checks prior to the importing of the keys found.

@example

```
import gpg
import hkp4py
import sys
```

```
c = gpg.Context()
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")
results = []
keys = []
```

```
if len(sys.argv) > 2:
    pattern = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    pattern = sys.argv[1]
else:
    pattern = input("Enter the pattern to search for keys or user IDs: ")
```

```
if pattern is not None:
    try:
        key = server.search(hex(int(pattern, 16)))
        keyed = True
```

```

except ValueError as ve:
    key = server.search(pattern)
    keyed = False

if key is not None:
    keys.append(key[0])
    if keyed is True:
        try:
            fob = server.search(pattern)
        except:
            fob = None
        if fob is not None:
            keys.append(fob[0])
    else:
        pass
else:
    pass

for logrus in pattern.split():
    try:
        key = server.search(hex(int(logrus, 16)))
        hexed = True
    except ValueError as ve:
        key = server.search(logrus)
        hexed = False

    if key is not None:
        keys.append(key[0])
        if hexed is True:
            try:
                fob = server.search(logrus)
            except:
                fob = None
            if fob is not None:
                keys.append(fob[0])
        else:
            pass
    else:
        pass

if len(keys) > 0:
    for key in keys:
        import_result = c.key_import(key.key_blob)
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:

```

```

    print(result)
elif result is not None and hasattr(result, "considered") is True:
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scert = result.secret_imported
    nochange = result.unchanged
    print("""
The total number of keys considered for import was: @ {0@ }

    Number of keys revoked: @ {1@ }
Number of new signatures: @ {2@ }
    Number of new subkeys: @ {3@ }
    Number of new user IDs: @ {4@ }
Number of new secret keys: @ {5@ }
Number of unchanged keys: @ {6@ }

The key IDs for all considered keys were:
""").format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scert,
            nochange))
    for i in range(num_keys):
        print(result.imports[i].fpr)
    print("")
else:
    pass
@end example

```

Since the hkp4py module handles multiple keys just as effectively as one (@samp{keys} is a list of responses per matching key), the example above is able to do a little bit more with the returned data before anything is actually imported.

```

@node Importing from ProtonMail with HKP for Python
@subsection Importing from ProtonMail with HKP for Python

```

Though this can provide certain benefits even when working with ProtonMail, the scope is somewhat constrained there due to the limitations of the ProtonMail keyserver.

For instance, searching the SKS keyserver pool for the term "gnupg" produces hundreds of results from any time the word appears in any part of a user ID. Performing the same search on the ProtonMail keyserver returns zero results, even though there are at least two test accounts which include it as part of the username.

The cause of this discrepancy is the deliberate configuration of that

server by ProtonMail to require an exact match of the full email address of the ProtonMail user whose key is being requested. Presumably this is intended to reduce breaches of privacy of their users as an email address must already be known before a key for that address can be obtained.

@enumerate

@item

Import from ProtonMail via HKP for Python Example no. 1

The following script is available with the rest of the examples under the somewhat less than original name, @samp{pmkey-import-hkp.py}.

@example

```
import gpg
```

```
import hkp4py
```

```
import os.path
```

```
import sys
```

```
print("""
```

```
This script searches the ProtonMail key server for the specified key and imports it.
```

```
Usage: pmkey-import-hkp.py [search strings]
```

```
""")
```

```
c = gpg.Context(armor=True)
```

```
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
```

```
keyterms = []
```

```
ksearch = []
```

```
allkeys = []
```

```
results = []
```

```
paradox = []
```

```
homeless = None
```

```
if len(sys.argv) > 2:
```

```
    keyterms = sys.argv[1:]
```

```
elif len(sys.argv) == 2:
```

```
    keyterm = sys.argv[1]
```

```
    keyterms.append(keyterm)
```

```
else:
```

```
    key_term = input("Enter the key ID, UID or search string: ")
```

```
    keyterms = key_term.split()
```

```
for keyterm in keyterms:
```

```
    if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
```

```
        ksearch.append(keyterm[1:])
```

```

    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
    ksearch.append("@{0@}@@protonmail.com".format(keyterm[1:]))
    ksearch.append("@{0@}@@protonmail.ch".format(keyterm[1:]))
    ksearch.append("@{0@}@@pm.me".format(keyterm[1:]))
elif keyterm.count("@@") == 0:
    ksearch.append("@{0@}@@protonmail.com".format(keyterm))
    ksearch.append("@{0@}@@protonmail.ch".format(keyterm))
    ksearch.append("@{0@}@@pm.me".format(keyterm))
elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
    uidlist = keyterm.split("@@")
    for uid in uidlist:
        ksearch.append("@{0@}@@protonmail.com".format(uid))
        ksearch.append("@{0@}@@protonmail.ch".format(uid))
        ksearch.append("@{0@}@@pm.me".format(uid))
elif keyterm.count("@@") > 2:
    uidlist = keyterm.split("@@")
    for uid in uidlist:
        ksearch.append("@{0@}@@protonmail.com".format(uid))
        ksearch.append("@{0@}@@protonmail.ch".format(uid))
        ksearch.append("@{0@}@@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: @{0@}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
                try:
                    import_result = c.key_import(key.key_blob)
                except Exception as e:
                    import_result = c.key_import(key.key)
            else:
                paradox.append(keys)
                import_result = None
        except Exception as e:
            import_result = None
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("@{0@} for @{1@}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)

```

```
new_revs = result.new_revocations
new_sigs = result.new_signatures
new_subs = result.new_sub_keys
new_uids = result.new_user_ids
new_scert = result.secret_imported
nochange = result.unchanged
print("""
```

The total number of keys considered for import was: @ {0@ }

With UIDs wholly or partially matching the following string:

```
@ {1@ }
```

```
Number of keys revoked: @ {2@ }
```

```
Number of new signatures: @ {3@ }
```

```
Number of new subkeys: @ {4@ }
```

```
Number of new user IDs: @ {5@ }
```

```
Number of new secret keys: @ {6@ }
```

```
Number of unchanged keys: @ {7@ }
```

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
```

```
@end example
```

```
@item
```

Import from ProtonMail via HKP for Python Example no. 2

Like its counterpart above, this script can also be found with the rest of the examples, by the name pmkey-import-hkp-alt.py.

With this script a modicum of effort has been made to treat anything passed as a @samp{homedir} which either does not exist or which is not a directory, as also being a possible user ID to check for. It's not guaranteed to pick up on all such cases, but it should cover most of them.

```
@example
```

```
import gpg
import hkp4py
import os.path
import sys
```

```
print("""
This script searches the ProtonMail key server for the specified key and
imports it. Optionally enables specifying a different GnuPG home directory.
```

```
Usage: pmkey-import-hkp.py [homedir] [search string]
or: pmkey-import-hkp.py [search string]
""")
```

```
c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None
```

```
if len(sys.argv) > 3:
    homedir = sys.argv[1]
    keyterms = sys.argv[2:]
elif len(sys.argv) == 3:
    homedir = sys.argv[1]
    keyterm = sys.argv[2]
    keyterms.append(keyterm)
elif len(sys.argv) == 2:
    homedir = ""
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    keyterm = input("Enter the key ID, UID or search string: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
    keyterms.append(keyterm)
```

```
if len(homedir) == 0:
    homedir = None
    homeless = False
```

```
if homedir is not None:
    if homedir.startswith("~"):
        if os.path.exists(os.path.expanduser(homedir)) is True:
            if os.path.isdir(os.path.expanduser(homedir)) is True:
                c.home_dir = os.path.realpath(os.path.expanduser(homedir))
            else:
                homeless = True
        else:
            homeless = True
    elif os.path.exists(os.path.realpath(homedir)) is True:
```

```

if os.path.isdir(os.path.realpath(homedir)) is True:
    c.home_dir = os.path.realpath(homedir)
else:
    homeless = True
else:
    homeless = True

# First check to see if the homedir really is a homedir and if not, treat it as
# a search string.
if homeless is True:
    keyterms.append(homedir)
    c.home_dir = None
else:
    pass

for keyterm in keyterms:
    if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
    elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
        ksearch.append("@{0@}@@protonmail.com".format(keyterm[1:]))
        ksearch.append("@{0@}@@protonmail.ch".format(keyterm[1:]))
        ksearch.append("@{0@}@@pm.me".format(keyterm[1:]))
    elif keyterm.count("@@") == 0:
        ksearch.append("@{0@}@@protonmail.com".format(keyterm))
        ksearch.append("@{0@}@@protonmail.ch".format(keyterm))
        ksearch.append("@{0@}@@pm.me".format(keyterm))
    elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
        uidlist = keyterm.split("@@")
        for uid in uidlist:
            ksearch.append("@{0@}@@protonmail.com".format(uid))
            ksearch.append("@{0@}@@protonmail.ch".format(uid))
            ksearch.append("@{0@}@@pm.me".format(uid))
    elif keyterm.count("@@") > 2:
        uidlist = keyterm.split("@@")
        for uid in uidlist:
            ksearch.append("@{0@}@@protonmail.com".format(uid))
            ksearch.append("@{0@}@@protonmail.ch".format(uid))
            ksearch.append("@{0@}@@pm.me".format(uid))
    else:
        ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: @{0@}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:

```

```

for key in keys:
    allkeys.append(key)
    try:
        import_result = c.key_import(key.key_blob)
    except Exception as e:
        import_result = c.key_import(key.key)
else:
    paradox.append(keys)
    import_result = None
except Exception as e:
    import_result = None
results.append(import_result)

```

```

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("@{0@} for @{1@}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_s crt = result.secret_imported
        nochange = result.unchanged
        print("""

```

The total number of keys considered for import was: @{0@}

With UIDs wholly or partially matching the following string:

```
@{1@}
```

```

Number of keys revoked: @{2@}
Number of new signatures: @{3@}
Number of new subkeys: @{4@}
Number of new user IDs: @{5@}
Number of new secret keys: @{6@}
Number of unchanged keys: @{7@}

```

The key IDs for all considered keys were:

```

"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_s crt,
nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
@end example
@end enumerate

```

@node Exporting keys  
@section Exporting keys

Exporting keys remains a reasonably simple task, but has been separated into three different functions for the OpenPGP cryptographic engine. Two of those functions are for exporting public keys and the third is for exporting secret keys.

@menu  
\* Exporting public keys::  
\* Exporting secret keys::  
\* Sending public keys to the SKS Keyservers::  
@end menu

@node Exporting public keys  
@subsection Exporting public keys

There are two methods of exporting public keys, both of which are very similar to the other. The default method, @samp{key\_export()}, will export a public key or keys matching a specified pattern as normal. The alternative, the @samp{key\_export\_minimal()} method, will do the same thing except producing a minimised output with extra signatures and third party signatures or certifications removed.

```
@example
import gpg
import os.path
import sys

print("""
This script exports one or more public keys.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
```

```

else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export(pattern=logrus)
except:
    result = c.key_export(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
@end example

```

It should be noted that the result will only return @samp{None} when a search pattern has been entered, but has not matched any keys. When the search pattern itself is set to @samp{None} this triggers the exporting of the entire public keybox.

```

@example
import gpg
import os.path
import sys

print("""
This script exports one or more public keys in minimised form.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:

```

```

    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_minimal(pattern=logrus)
except:
    result = c.key_export_minimal(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
@end example

```

@node Exporting secret keys

@subsection Exporting secret keys

Exporting secret keys is, functionally, very similar to exporting public keys; save for the invocation of @samp{pinentry} via @samp{gpg-agent} in order to securely enter the key's passphrase and authorise the export.

The following example exports the secret key to a file which is then set with the same permissions as the output files created by the command line secret key export options.

```

@example
import gpg
import os

```

```

import os.path
import sys

print("""
This script exports one or more secret keys.

The gpg-agent and pinentry are invoked to authorise the export.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:

```

```

    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_secret(pattern=logrus)
except:
    result = c.key_export_secret(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
    os.chmod(keyfile, 0o600)
else:
    pass
@end example

```

Alternatively the approach of the following script can be used. This longer example saves the exported secret key(s) in files in the GnuPG home directory, in addition to setting the file permissions as only readable and writable by the user. It also exports the secret key(s) twice in order to output both GPG binary (@samp{.gpg}) and ASCII armoured (@samp{.asc}) files.

```

@example
import gpg
import os
import os.path
import subprocess
import sys

print("""
This script exports one or more secret keys as both ASCII armored and binary
file formats, saved in files within the user's GPG home directory.

The gpg-agent and pinentry are invoked to authorise the export.
""")

if sys.platform == "win32":
    gpgconfcmd = "gpgconf.exe --list-dirs homedir"
else:
    gpgconfcmd = "gpgconf --list-dirs homedir"

a = gpg.Context(armor=True)
b = gpg.Context()
c = gpg.Context()

if len(sys.argv) >= 4:

```

```

    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~/"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

if c.home_dir is not None:
    if c.home_dir.endswith("/"):
        gpgfile = "@{0@}@{1@}.gpg".format(c.home_dir, keyfile)
        ascfile = "@{0@}@{1@}.asc".format(c.home_dir, keyfile)
    else:
        gpgfile = "@{0@}/@{1@}.gpg".format(c.home_dir, keyfile)
        ascfile = "@{0@}/@{1@}.asc".format(c.home_dir, keyfile)
else:

```

```

if os.path.exists(os.environ["GNUPGHOME"]) is True:
    hd = os.environ["GNUPGHOME"]
else:
    try:
        hd = subprocess.getoutput(gpgconfcmd)
    except:
        process = subprocess.Popen(gpgconfcmd.split(),
                                    stdout=subprocess.PIPE)
        procom = process.communicate()
        if sys.version_info[0] == 2:
            hd = procom[0].strip()
        else:
            hd = procom[0].decode().strip()
    gpgfile = "@{0@}/{1@}.gpg".format(hd, keyfile)
    ascfile = "@{0@}/{1@}.asc".format(hd, keyfile)

try:
    a_result = a.key_export_secret(pattern=logrus)
    b_result = b.key_export_secret(pattern=logrus)
except:
    a_result = a.key_export_secret(pattern=None)
    b_result = b.key_export_secret(pattern=None)

if a_result is not None:
    with open(ascfile, "wb") as f:
        f.write(a_result)
    os.chmod(ascfile, 0o600)
else:
    pass

if b_result is not None:
    with open(gpgfile, "wb") as f:
        f.write(b_result)
    os.chmod(gpgfile, 0o600)
else:
    pass
@end example

```

@node Sending public keys to the SKS Keyservers

@subsection Sending public keys to the SKS Keyservers

As with the previous section on importing keys, the @samp{hkp4py} module adds another option with exporting keys in order to send them to the public keyservers.

The following example demonstrates how this may be done.

@example

```

import gpg
import hkp4py
import os.path
import sys

print("""
This script sends one or more public keys to the SKS keyserver and is
essentially a slight variation on the export-key.py script.
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyserver.net")

if len(sys.argv) > 2:
    logrus = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    logrus = sys.argv[1]
else:
    logrus = input("Enter the UID matching the key(s) to send: ")

if len(logrus) > 0:
    try:
        export_result = c.key_export(pattern=logrus)
    except Exception as e:
        print(e)
        export_result = None
    else:
        export_result = c.key_export(pattern=None)

if export_result is not None:
    try:
        try:
            send_result = server.add(export_result)
        except:
            send_result = server.add(export_result.decode())
        if send_result is not None:
            print(send_result)
        else:
            pass
    except Exception as e:
        print(e)
    else:
        pass
@end example

```

An expanded version of this script with additional functions for specifying an alternative homedir location is in the examples directory as @samp{send-key-to-keyserver.py}.

The `@samp{hkp4py}` module appears to handle both string and byte literal text data equally well, but the GPGME bindings deal primarily with byte literal data only and so this script sends in that format first, then tries the string literal form.

`@node Basic Functions`

`@chapter Basic Functions`

The most frequently called features of any cryptographic library will be the most fundamental tasks for encryption software. In this section we will look at how to programmatically encrypt data, decrypt it, sign it and verify signatures.

`@menu`

\* Encryption::

\* Decryption::

\* Signing text and files::

\* Signature verification::

`@end menu`

`@node Encryption`

`@section Encryption`

Encrypting is very straight forward. In the first example below the message, `@samp{text}`, is encrypted to a single recipient's key. In the second example the message will be encrypted to multiple recipients.

`@menu`

\* Encrypting to one key::

\* Encrypting to multiple keys::

`@end menu`

`@node Encrypting to one key`

`@subsection Encrypting to one key`

Once the the Context is set the main issues with encrypting data is essentially reduced to key selection and the keyword arguments specified in the `@samp{gpg.Context().encrypt()}` method.

Those keyword arguments are: `@samp{recipients}`, a list of keys encrypted to (covered in greater detail in the following section); `@samp{sign}`, whether or not to sign the plaintext data, see subsequent sections on signing and verifying signatures below (defaults to `@samp{True}`); `@samp{sink}`, to write results or partial results to a secure sink instead of returning it (defaults to `@samp{None}`); `@samp{passphrase}`, only used when utilising symmetric encryption (defaults to `@samp{None}`); `@samp{always_trust}`, used to override the trust model settings for recipient keys (defaults to `@samp{False}`);

@samp{add\_encrypt\_to}, utilises any preconfigured @samp{encrypt-to} or @samp{default-key} settings in the user's @samp{gpg.conf} file (defaults to @samp{False}); @samp{prepare}, prepare for encryption (defaults to @samp{False}); @samp{expect\_sign}, prepare for signing (defaults to @samp{False}); @samp{compress}, compresses the plaintext prior to encryption (defaults to @samp{True}).

```
@example
import gpg
```

```
a_key = "0x12345678DEADBEEF"
text = b""Some text to test with.
```

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

```
""""

c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=False)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
@end example
```

Though this is even more likely to be used like this; with the plaintext input read from a file, the recipient keys used for encryption regardless of key trust status and the encrypted output also encrypted to any preconfigured keys set in the @samp{gpg.conf} file:

```
@example
import gpg
```

```
a_key = "0x12345678DEADBEEF"
```

```
with open("secret_plans.txt", "rb") as afile:
    text = afile.read()
```

```
c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=True,
                                           always_trust=True,
                                           add_encrypt_to=True)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
@end example
```

If the `@samp{recipients}` parameter is empty then the plaintext is encrypted symmetrically. If no `@samp{passphrase}` is supplied as a parameter or via a callback registered with the `@samp{Context()}` then an out-of-band prompt for the passphrase via `pinentry` will be invoked.

`@node` Encrypting to multiple keys  
`@subsection` Encrypting to multiple keys

Encrypting to multiple keys essentially just expands upon the key selection process and the recipients from the previous examples.

The following example encrypts a message (`@samp{text}`) to everyone with an email address on the `@samp{gnupg.org}` domain,`@footnote{ You probably don't really want to do this. Searching the`  
keyservers for "gnupg.org" produces over 400 results, the majority of which aren't actually at the `gnupg.org` domain, but just included a comment regarding the project in their key somewhere.) but does `@emph{not}` encrypt to a default key or other key which is configured to normally encrypt to.

`@example`  
`import gpg`

```
text = b""Oh look, another test message.
```

The same rules apply as with the previous example and more likely than not, the message will actually be drawn from reading the contents of a file or, maybe, from entering data at an `input()` prompt.

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

```
"""
```

```
c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []
```

```
for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])
```

```
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             sign=False, always_trust=True)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
```

```
    afile.write(ciphertext)
@end example
```

All it would take to change the above example to sign the message and also encrypt the message to any configured default keys would be to change the `@samp{c.encrypt}` line to this:

```
@example
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                           always_trust=True,
                                           add_encrypt_to=True)
@end example
```

The only keyword arguments requiring modification are those for which the default values are changing. The default value of `@samp{sign}` is `@samp{True}`, the default of `@samp{always_trust}` is `@samp{False}`, the default of `@samp{add_encrypt_to}` is `@samp{False}`.

If `@samp{always_trust}` is not set to `@samp{True}` and any of the recipient keys are not trusted (e.g. not signed or locally signed) then the encryption will raise an error. It is possible to mitigate this somewhat with something more like this:

```
@example
import gpg

with open("secret_plans.txt.asc", "rb") as afile:
    text = afile.read()

c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []

for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])

try:
    ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                                add_encrypt_to=True)
except gpg.errors.InvalidRecipients as e:
    for i in range(len(e.recipients)):
        for n in range(len(logrus)):
            if logrus[n].fpr == e.recipients[i].fpr:
                logrus.remove(logrus[n])
        else:
            pass
try:
```

```

    ciphertext, result, sign_result = c.encrypt(text,
                                                recipients=logrus,
                                                add_encrypt_to=True)
    with open("secret_plans.txt.asc", "wb") as afile:
        afile.write(ciphertext)
except:
    pass
@end example

```

This will attempt to encrypt to all the keys searched for, then remove invalid recipients if it fails and try again.

```

@node Decryption
@section Decryption

```

Decrypting something encrypted to a key in one's secret keyring is fairly straight forward.

In this example code, however, preconfiguring either `@samp{gpg.Context()}` or `@samp{gpg.core.Context()}` as `@samp{c}` is unnecessary because there is no need to modify the Context prior to conducting the decryption and since the Context is only used once, setting it to `@samp{c}` simply adds lines for no gain.

```

@example
import gpg

ciphertext = input("Enter path and filename of encrypted file: ")
newfile = input("Enter path and filename of file to save decrypted data to: ")

with open(ciphertext, "rb") as cfile:
    try:
        plaintext, result, verify_result = gpg.Context().decrypt(cfile)
    except gpg.errors.GPGMEError as e:
        plaintext = None
        print(e)

if plaintext is not None:
    with open(newfile, "wb") as nfile:
        nfile.write(plaintext)
else:
    pass
@end example

```

The data available in `@samp{plaintext}` in this example is the decrypted content as a byte object, the recipient key IDs and algorithms in `@samp{result}` and the results of verifying any signatures of the data in `@samp{verify_result}`.

If `@samp{gpg.Context().decrypt(cfile, verify=False)}` is called instead, then `@samp{verify_result}` will be returned as `@samp{None}` and the rest remains as described here.

`@node Signing text and files`  
`@section Signing text and files`

The following sections demonstrate how to specify keys to sign with.

```
@menu
* Signing key selection::
* Normal or default signing messages or files::
* Detached signing messages and files::
* Clearsigning messages or text::
@end menu
```

```
@node Signing key selection
@subsection Signing key selection
```

By default GPGME and the Python bindings will use the default key configured for the user invoking the GPGME API. If there is no default key specified and there is more than one secret key available it may be necessary to specify the key or keys with which to sign messages and files.

```
@example
import gpg

logrus = input("Enter the email address or string to match signing keys to: ")
hancock = gpg.Context().keylist(pattern=logrus, secret=True)
sig_src = list(hancock)
@end example
```

The signing examples in the following sections include the explicitly designated `@samp{signers}` parameter in two of the five examples; once where the resulting signature would be ASCII armoured and once where it would not be armoured.

While it would be possible to enter a key ID or fingerprint here to match a specific key, it is not possible to enter two fingerprints and match two keys since the patten expects a string, bytes or None and not a list. A string with two fingerprints won't match any single key.

```
@node Normal or default signing messages or files
@subsection Normal or default signing messages or files
```

The normal or default signing process is essentially the same as is most often invoked when also encrypting a message or file. So when the encryption component is not utilised, the result is to produce an encoded and signed output which may or may not be ASCII armoured and which may or may not also be compressed.

By default compression will be used unless GnuPG detects that the plaintext is already compressed. ASCII armouring will be determined according to the value of `@samp{gpg.Context().armor}`.

The compression algorithm is selected in much the same way as the symmetric encryption algorithm or the hash digest algorithm is when multiple keys are involved; from the preferences saved into the key itself or by comparison with the preferences with all other keys involved.

@example

```
import gpg
```

```
text0 = ""Declaration of ... something.
```

```
""
```

```
text = text0.encode()
```

```
c = gpg.Context(armor=True, signers=sig_src)
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)
```

```
with open("/path/to/statement.txt.asc", "w") as afile:
```

```
    afile.write(signed_data.decode())
```

```
@end example
```

Though everything in this example is accurate, it is more likely that reading the input data from another file and writing the result to a new file will be performed more like the way it is done in the next example. Even if the output format is ASCII armoured.

@example

```
import gpg
```

```
with open("/path/to/statement.txt", "rb") as tfile:
```

```
    text = tfile.read()
```

```
c = gpg.Context()
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)
```

```
with open("/path/to/statement.txt.sig", "wb") as afile:
```

```
    afile.write(signed_data)
```

```
@end example
```

@node Detached signing messages and files

@subsection Detached signing messages and files

Detached signatures will often be needed in programmatic uses of GPGME, either for signing files (e.g. tarballs of code releases) or as a component of message signing (e.g. PGP/MIME encoded email).

@example

```
import gpg
```

```
text0 = ""Declaration of ... something.
```

```
""
```

```
text = text0.encode()
```

```
c = gpg.Context(armor=True)
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)
```

```
with open("/path/to/statement.txt.asc", "w") as afile:
```

```
    afile.write(signed_data.decode())
```

@end example

As with normal signatures, detached signatures are best handled as byte literals, even when the output is ASCII armoured.

@example

```
import gpg
```

```
with open("/path/to/statement.txt", "rb") as tfile:
```

```
    text = tfile.read()
```

```
c = gpg.Context(signers=sig_src)
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)
```

```
with open("/path/to/statement.txt.sig", "wb") as afile:
```

```
    afile.write(signed_data)
```

@end example

@node Clearsigning messages or text

@subsection Clearsigning messages or text

Though PGP/in-line messages are no longer encouraged in favour of PGP/MIME, there is still sometimes value in utilising in-line signatures. This is where clear-signed messages or text is of value.

@example

```
import gpg
```

```

text0 = ""Declaration of ... something.

""
text = text0.encode()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
@end example

```

In spite of the appearance of a clear-signed message, the data handled by GPGME in signing it must still be byte literals.

```

@example
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "wb") as afile:
    afile.write(signed_data)
@end example

```

```

@node Signature verification
@section Signature verification

```

Essentially there are two principal methods of verification of a signature. The first of these is for use with the normal or default signing method and for clear-signed messages. The second is for use with files and data with detached signatures.

The following example is intended for use with the default signing method where the file was not ASCII armoured:

```

@example
import gpg
import time

filename = "statement.txt"
gpg_file = "statement.txt.gpg"

c = gpg.Context()

```

```

try:
    data, result = c.verify(open(gpg_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@ }
with key @{1@ }
made at @{2@ }
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
else:
    pass
@end example

```

Whereas this next example, which is almost identical would work with normal ASCII armoured files and with clear-signed files:

```

@example
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@ }
with key @{1@ }
made at @{2@ }
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,

```

```

        time.ctime(sign.timestamp)))
else:
    pass
@end example

```

In both of the previous examples it is also possible to compare the original data that was signed against the signed data in `@samp{data}` to see if it matches with something like this:

```

@example
with open(filename, "rb") as afile:
    text = afile.read()

if text == data:
    print("Good signature.")
else:
    pass
@end example

```

The following two examples, however, deal with detached signatures. With his method of verification the data that was signed does not get returned since it is already being explicitly referenced in the first argument of `@samp{c.verify}`. So `@samp{data}` is `@samp{None}` and only the information in `@samp{result}` is available.

```

@example
import gpg
import time

filename = "statement.txt"
sig_file = "statement.txt.sig"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(sig_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@}
with key @{1@}
made at @{2@}

```

```

""" .format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
else:
    pass
@end example

@example
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@}
with key @{1@}
made at @{2@}
""" .format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
else:
    pass
@end example

```

@node Creating keys and subkeys

@chapter Creating keys and subkeys

The one thing, aside from GnuPG itself, that GPGME depends on, of course, is the keys themselves. So it is necessary to be able to generate them and modify them by adding subkeys, revoking or disabling them, sometimes deleting them and doing the same for user IDs.

In the following examples a key will be created for the world's greatest secret agent, Danger Mouse. Since Danger Mouse is a secret agent he needs to be able to protect information to @samp{SECRET} level clearance, so his keys will be 3072-bit keys.

The pre-configured @samp{pgp.conf} file which sets cipher, digest and other preferences contains the following configuration parameters:

```
@example
expert
allow-freeform-uid
allow-secret-key-import
trust-model tofu+pgp
tofu-default-policy unknown
enable-large-rsa
enable-dsa2
cert-digest-algo SHA512
default-preference-list TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1 ZLIB BZIP2 ZIP
Uncompressed
personal-cipher-preferences TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES
personal-digest-preferences SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1
personal-compress-preferences ZLIB BZIP2 ZIP Uncompressed
@end example
```

```
@menu
* Primary key::
* Subkeys::
* User IDs::
* Key certification::
@end menu
```

```
@node Primary key
@section Primary key
```

Generating a primary key uses the @samp{create\_key} method in a Context.

It contains multiple arguments and keyword arguments, including:

@samp{userid}, @samp{algorithm}, @samp{expires\_in}, @samp{expires}, @samp{sign}, @samp{encrypt}, @samp{certify}, @samp{authenticate}, @samp{passphrase} and @samp{force}. The defaults for all of those except @samp{userid}, @samp{algorithm}, @samp{expires\_in}, @samp{expires} and @samp{passphrase} is @samp{False}. The defaults for @samp{algorithm} and @samp{passphrase} is @samp{None}. The default for @samp{expires\_in} is @samp{0}. The default for @samp{expires} is @samp{True}. There is no default for @samp{userid}.

If @samp{passphrase} is left as @samp{None} then the key will not be generated with a passphrase, if @samp{passphrase} is set to a string then that will be the passphrase and if @samp{passphrase} is set to @samp{True} then gpg-agent will launch pinentry to prompt for a passphrase. For the sake of convenience, these examples will keep @samp{passphrase} set to @samp{None}.

```
@example
import gpg
```

```

c = gpg.Context()

c.home_dir = "~/gnupg-dm"
userid = "Danger Mouse <dm@@secret.example.net>"

dmkey = c.create_key(userid, algorithm="rsa3072", expires_in=31536000,
                    sign=True, certify=True)
@end example

```

One thing to note here is the use of setting the `@samp{c.home_dir}` parameter. This enables generating the key or keys in a different location. In this case to keep the new key data created for this example in a separate location rather than adding it to existing and active key store data. As with the default directory, `@samp{~/gnupg}`, any temporary or separate directory needs the permissions set to only permit access by the directory owner. On posix systems this means setting the directory permissions to 700.

The `@samp{temp-homedir-config.py}` script in the HOWTO examples directory will create an alternative homedir with these configuration options already set and the correct directory and file permissions.

The successful generation of the key can be confirmed via the returned `@samp{GenkeyResult}` object, which includes the following data:

```

@example
print("""
Fingerprint: @ {0@ }
Primary Key: @ {1@ }
Public Key: @ {2@ }
Secret Key: @ {3@ }
Sub Key: @ {4@ }
User IDs: @ {5@ }
""").format(dmkey.fpr, dmkey.primary, dmkey.pubkey, dmkey.seckey, dmkey.sub,
            dmkey.uid)
@end example

```

Alternatively the information can be confirmed using the command line program:

```

@example
bash-4.4$ gpg --homedir ~/gnupg-dm -K
~/gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
    177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@@secret.example.net>

```

```
bash-4.4$
@end example
```

As with generating keys manually, to preconfigure expanded preferences for the cipher, digest and compression algorithms, the @samp{gpg.conf} file must contain those details in the home directory in which the new key is being generated. I used a cut down version of my own @samp{gpg.conf} file in order to be able to generate this:

```
@example
bash-4.4$ gpg --homedir ~/.gnupg-dm --edit-key 177B7C25DB99745EE2EE13ED026D2F19E99E63AA showpref
quit
Secret key is available.
```

```
sec rsa3072/026D2F19E99E63AA
  created: 2018-03-15  expires: 2019-03-15  usage: SC
  trust: ultimate    validity: ultimate
[ultimate] (1). Danger Mouse <dm@@secret.example.net>
```

```
[ultimate] (1). Danger Mouse <dm@@secret.example.net>
  Cipher: TWOFISH, CAMELLIA256, AES256, CAMELLIA192, AES192, CAMELLIA128, AES, BLOWFISH,
  IDEA, CAST5, 3DES
  Digest: SHA512, SHA384, SHA256, SHA224, RIPEMD160, SHA1
  Compression: ZLIB, BZIP2, ZIP, Uncompressed
  Features: MDC, Keyserver no-modify
```

```
bash-4.4$
@end example
```

```
@node Subkeys
@section Subkeys
```

Adding subkeys to a primary key is fairly similar to creating the primary key with the @samp{create\_subkey} method. Most of the arguments are the same, but not quite all. Instead of the @samp{userid} argument there is now a @samp{key} argument for selecting which primary key to add the subkey to.

In the following example an encryption subkey will be added to the primary key. Since Danger Mouse is a security conscious secret agent, this subkey will only be valid for about six months, half the length of the primary key.

```
@example
import gpg

c = gpg.Context()
```

```
c.home_dir = "~/gnupg-dm"
```

```
key = c.get_key(dmkey.fpr, secret=True)
dmsub = c.create_subkey(key, algorithm="rsa3072", expires_in=15768000,
                        encrypt=True)
@end example
```

As with the primary key, the results here can be checked with:

```
@example
print("""
Fingerprint: @ {0@ }
Primary Key: @ {1@ }
Public Key: @ {2@ }
Secret Key: @ {3@ }
Sub Key: @ {4@ }
User IDs: @ {5@ }
""").format(dmsub.fpr, dmsub.primary, dmsub.pubkey, dmsub.seckey, dmsub.sub,
            dmsub.uid)
@end example
```

As well as on the command line with:

```
@example
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
     177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
@end example
```

```
@node User IDs
@section User IDs
```

```
@menu
* Adding User IDs::
* Revoking User IDs::
@end menu
```

```
@node Adding User IDs
@subsection Adding User IDs
```

By comparison to creating primary keys and subkeys, adding a new user ID to an existing key is much simpler. The method used to do this is

@samp{key\_add\_uid} and the only arguments it takes are for the @samp{key} and the new @samp{uid}.

```
@example
import gpg
```

```
c = gpg.Context()
c.home_dir = "~/gnupg-dm"
```

```
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
uid = "Danger Mouse <danger.mouse@@secret.example.net>"
```

```
c.key_add_uid(key, uid)
@end example
```

Unsurprisingly the result of this is:

```
@example
```

```
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/gnupg-dm/pubring.kbx
```

```
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
     177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid   [ultimate] Danger Mouse <danger.mouse@@secret.example.net>
uid   [ultimate] Danger Mouse <dm@@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]
```

```
bash-4.4$
@end example
```

```
@node Revoking User IDs
@subsection Revoking User IDs
```

Revoking a user ID is a fairly similar process, except that it uses the @samp{key\_revoke\_uid} method.

```
@example
import gpg
```

```
c = gpg.Context()
c.home_dir = "~/gnupg-dm"
```

```
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
uid = "Danger Mouse <danger.mouse@@secret.example.net>"
```

```
c.key_revoke_uid(key, uid)
```

@end example

@node Key certification

@section Key certification

Since key certification is more frequently referred to as key signing, the method used to perform this function is @samp{key\_sign}.

The @samp{key\_sign} method takes four arguments: @samp{key}, @samp{uids}, @samp{expires\_in} and @samp{local}. The default value of @samp{uids} is @samp{None} and which results in all user IDs being selected. The default value of both @samp{expires\_in} and @samp{local} is @samp{False}; which results in the signature never expiring and being able to be exported.

The @samp{key} is the key being signed rather than the key doing the signing. To change the key doing the signing refer to the signing key selection above for signing messages and files.

If the @samp{uids} value is not @samp{None} then it must either be a string to match a single user ID or a list of strings to match multiple user IDs. In this case the matching of those strings must be precise and it is case sensitive.

To sign Danger Mouse's key for just the initial user ID with a signature which will last a little over a month, do this:

@example

```
import gpg
```

```
c = gpg.Context()
```

```
uid = "Danger Mouse <dm@@secret.example.net>"
```

```
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
```

```
key = c.get_key(dmfpr, secret=True)
```

```
c.key_sign(key, uids=uid, expires_in=2764800)
```

```
@end example
```

@menu

\* Verifying key certifications::

@end menu

@node Verifying key certifications

@subsection Verifying key certifications

@example

```
import gpg
```

```
import time
```

```

c = gpg.Context()
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

```

```

for user in key.uids:
    for sig in user.signatures:
        print("0x@{0@}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
@end example

```

Which for Danger Mouse displays the following:

```

@example
0x92E3F6115435C65A Thu Mar 15 13:17:44 2018 Danger Mouse <dm@@secret.example.net>
0x321E4E2373590E5D Mon Nov 26 12:46:05 2018 Ben McGinnes <ben@@adversary.org>
@end example

```

The two key signatures listed are for the self-certification of Danger Mouse's key made when the key was created in March, 2018; and the second is a signature made by the author and set to expire at the end of the year. Note that the second signature was made with the following code (including the preceding code to display the output of the certifications or key signatures):

```

@example
import gpg
import math
import pendulum
import time

hd = "/home/dm/.gnupg"
c = gpg.Context()
d = gpg.Context(home_dir=hd)
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
dmuid = "Danger Mouse <dm@@secret.example.net>"
dkeys = list(c.keylist(pattern=dmuid))
dmkey = dkeys[0]

c.key_import(d.key_export(pattern=None))

tp = pendulum.period(pendulum.now(tz="local"), pendulum.datetime(2019, 1, 1))
ts = tp.total_seconds()
total_secs = math.ceil(ts)
c.key_sign(dmkey, uids=dmuid, expires_in=total_secs)

d.key_import(c.key_export(pattern=dmuid))
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))

```

```
key = keys[0]
```

```
for user in key.uids:
```

```
    for sig in user.signatures:
```

```
        print("0x@{0@}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
```

```
@end example
```

Note that this final code block includes the use of a module which is

**not** part of Python's standard library, the <https://pendulum.eustace.io/>, pendulum module}. Unlike the standard datetime module, pendulum makes working with dates and times significantly easier in Python; just as the requests module makes working with HTTP and HTTPS easier than the builtin modules do.

Though neither requests nor pendulum are required modules for using the GPGME Python bindings, they are both highly recommended more generally.

```
@node Advanced or Experimental Use Cases
```

```
@chapter Advanced or Experimental Use Cases
```

```
@menu
```

```
* C plus Python plus SWIG plus Cython::
```

```
@end menu
```

```
@node C plus Python plus SWIG plus Cython
```

```
@section C plus Python plus SWIG plus Cython
```

In spite of the apparent incongruence of using Python bindings to a C interface only to generate more C from the Python; it is in fact quite possible to use the GPGME bindings with <http://docs.cython.org/en/latest/index.html>, Cython}. Though in many cases

the benefits may not be obvious since the most computationally intensive work never leaves the level of the C code with which GPGME itself is interacting with.

Nevertheless, there are some situations where the benefits are demonstrable. One of the better and easier examples being the one of the early examples in this HOWTO, the [Counting keys, , key counting](#) code. Running that example as an executable Python script, `keycount.py` (available in the `examples/howto/` directory), will take a noticeable amount of time to run on most systems where the public keybox or keyring contains a few thousand public keys.

Earlier in the evening, prior to starting this section, I ran that script on my laptop; as I tend to do periodically and timed it using `time` utility, with the following results:

```
@example
bash-4.4$ time keycount.py
```

```
Number of secret keys: 23
Number of public keys: 12112
```

```
real    11m52.945s
user    0m0.913s
sys     0m0.752s
```

```
bash-4.4$
@end example
```

Sometime after that I imported another key and followed it with a little test of Cython. This test was kept fairly basic, essentially lifting the material from the [@uref{http://docs.cython.org/en/latest/src/tutorial/cython\\_tutorial.html}](http://docs.cython.org/en/latest/src/tutorial/cython_tutorial.html), Cython Basic Tutorial} to demonstrate compiling Python code to C. The first step was to take the example key counting code quoted previously, essentially from the importing of the `gpg` module to the end of the script:

```
@example
import gpg

c = gpg.Context()
seckeys = c.keylist(pattern=None, secret=True)
pubkeys = c.keylist(pattern=None, secret=False)

seclist = list(seckeys)
secnum = len(seclist)

publist = list(pubkeys)
pubnum = len(publist)

print("""
    Number of secret keys: @0@
    Number of public keys: @1@

""".format(secnum, pubnum))
@end example
```

Save that into a file called `keycount.pyx` and then create a `setup.py` file which contains this:

```
@example
from distutils.core import setup
from Cython.Build import cythonize
```

```
setup(  
    ext_modules = cythonize("keycount.pyx")  
)  
@end example
```

Compile it:

```
@example  
bash-4.4$ python setup.py build_ext --inplace  
bash-4.4$  
@end example
```

Then run it in a similar manner to @samp{keycount.py}:

```
@example  
bash-4.4$ time python3.7 -c "import keycount"
```

```
Number of secret keys: 23  
Number of public keys: 12113
```

```
real    6m47.905s  
user    0m0.785s  
sys     0m0.331s
```

```
bash-4.4$  
@end example
```

Cython turned @samp{keycount.pyx} into an 81KB @samp{keycount.o} file in the @samp{build/} directory, a 24KB @samp{keycount.cpython-37m-darwin.so} file to be imported into Python 3.7 and a 113KB @samp{keycount.c} generated C source code file of nearly three thousand lines. Quite a bit bigger than the 314 bytes of the @samp{keycount.pyx} file or the full 1,452 bytes of the full executable @samp{keycount.py} example script.

On the other hand it ran in nearly half the time; taking 6 minutes and 47.905 seconds to run. As opposed to the 11 minutes and 52.945 seconds which the CPython script alone took.

The @samp{keycount.pyx} and @samp{setup.py} files used to generate this example have been added to the @samp{examples/howto/advanced/cython/} directory. The example versions include some additional options to annotate the existing code and to detect Cython's use. The latter comes from the @uref{http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd, Magic Attributes} section of the Cython documentation.

@node Miscellaneous extras and work-arounds

@chapter Miscellaneous extras and work-arounds

Most of the things in the following sections are here simply because there was no better place to put them, even though some are only peripherally related to the GPGME Python bindings. Some are also workarounds for functions not integrated with GPGME as yet. This is especially true of the first of these, dealing with @ref{Group lines, , group lines}.

@menu

\* Group lines::

\* Keyserver access for Python::

\* GPGME version checking::

@end menu

@node Group lines

@section Group lines

There is not yet an easy way to access groups configured in the `gpg.conf` file from within GPGME. As a consequence these central groupings of keys cannot be shared amongst multiple programs, such as MUAs readily.

The following code, however, provides a work-around for obtaining this information in Python.

@example

```
import subprocess
import sys
```

```
if sys.platform == "win32":
    gpgconfcmd = "gpgconf.exe --list-options gpg"
else:
    gpgconfcmd = "gpgconf --list-options gpg"
```

```
process = subprocess.Popen(gpgconfcmd.split(), stdout=subprocess.PIPE)
procom = process.communicate()
```

```
if sys.version_info[0] == 2:
    lines = procom[0].splitlines()
else:
    lines = procom[0].decode().splitlines()
```

```
for line in lines:
    if line.startswith("group") is True:
        break
```

```
groups = line.split(":")[-1].replace("'", "").split(',')
```

```

group_lines = []
group_lists = []

for group in groups:
    group_lines.append(group.split("="))
    group_lists.append(group.split("="))

```

```

for glist in group_lists:
    glist[1] = glist[1].split()
@end example

```

The result of that code is that `@samp{group_lines}` is a list of lists where `@samp{group_lines[i][0]}` is the name of the group and `@samp{group_lines[i][1]}` is the key IDs of the group as a string.

The `@samp{group_lists}` result is very similar in that it is a list of lists. The first part, `@samp{group_lists[i][0]}` matches `@samp{group_lines[i][0]}` as the name of the group, but `@samp{group_lists[i][1]}` is the key IDs of the group as a list.

A demonstration of using the `@samp{groups.py}` module is also available in the form of the executable `@samp{mutt-groups.py}` script. This second script reads all the group entries in a user's `@samp{gpg.conf}` file and converts them into crypt-hooks suitable for use with the Mutt and Neomutt mail clients.

```

@node Keyserver access for Python
@section Keyserver access for Python

```

The `@uref{https://github.com/Selfnet/hkp4py, hkp4py}` module by Marcel Fest was originally a port of the old `@uref{https://github.com/dgladkov/python-hkp, python-hkp}` module from Python 2 to Python 3 and updated to use the `@uref{http://docs.python-requests.org/en/latest/index.html, requests}` module instead. It has since been modified to provide support for Python 2.7 as well and is available via PyPI.

Since it rewrites the `@samp{hkp}` protocol prefix as `@samp{http}` and `@samp{hkps}` as `@samp{https}`, the module is able to be used even with servers which do not support the full scope of keyserver functions. `@footnote{Such as with ProtonMail servers. This also means that restricted servers which only advertise either HTTP or HTTPS end points and not HKP or HKPS end points must still be identified as as HKP or HKPS within the Python Code. The @samp{hkp4py} module will rewrite these appropriately when the connection is made to the server.}` It also works quite readily when incorporated into a `@ref{C plus Python plus SWIG plus Cython, , Cython}` generated and compiled version of any code.

```

@menu

```

\* Key import format::

@end menu

@node Key import format

@subsection Key import format

The `hkp4py` module returns key data via requests as string literals (`@samp{r.text}`) instead of byte literals (`@samp{r.content}`). This means that the returned key data must be encoded to UTF-8 when importing that key material using a `@samp{gpg.Context().key_import()}` method.

For this reason an alternative method has been added to the `@samp{search}` function of `@samp{hkp4py.KeyServer()}` which returns the key in the correct format as expected by `@samp{key_import}`. When importing using this module, it is now possible to import with this:

@example

for key in keys:

    if key.revoked is False:

        gpg.Context().key\_import(key.key\_blob)

    else:

        pass

@end example

Without that recent addition it would have been necessary to encode the contents of each `@samp{hkp4py.KeyServer().search()[i].key}` in `@samp{hkp4py.KeyServer().search()}` before trying to import it.

An example of this is included in the `@ref{Importing keys, , Importing Keys}` section of this HOWTO and the corresponding executable version of that example is available in the `@samp{lang/python/examples/howto}` directory as normal; the executable version is the `@samp{import-keys-hkp.py}` file.

@node GPGME version checking

@section GPGME version checking

For various reasons it may be necessary to check which version of GPGME the bindings have been built against; including whether a minimum required version of GPGME is in use.

For the most part the `@samp{gpg.version.versionstr}` and `@samp{gpg.version.versionlist}` methods have been quite sufficient. The former returns the same string as `@samp{gpgme-config --version}`, while the latter returns the major, minor and patch values in a list.

To check if the installed bindings have actually been built against the current installed `libgpgme` version, this check can be performed:

```

@example
import gpg
import subprocess
import sys

gpgme_version_call = subprocess.Popen(["gpgme-config", "--version"],
                                       stdout=subprocess.PIPE,
                                       stderr=subprocess.PIPE)
gpgme_version_str = gpgme_version_call.communicate()

if sys.version_info[0] == 2:
    gpgme_version = gpgme_version_str[0].strip()
elif sys.version_info[0] >= 3:
    gpgme_version = gpgme_version_str[0].decode().strip()
else:
    gpgme_version = None

if gpgme_version is not None:
    if gpgme_version == gpg.version.versionstr:
        print("The GPGME Python bindings match libgpgme.")
    else:
        print("The GPGME Python bindings do NOT match libgpgme.")
else:
    print("Upgrade Python and reinstall the GPGME Python bindings.")
@end example

```

For many developers, however, the preferred checking means checking for a minimum version or point release. This is now readily available via the `gpg.version.versionintlist` method (added in version `1.12.1-beta79`). It is also now possible to easily check whether the installed GPGME Python bindings were built from a development or beta branch of the GPGME source code.

The following code demonstrates how both of those methods may be used:

```

@example
import gpg

try:
    if gpg.version.is_beta is True:
        print("The installed GPGME Python bindings were built from beta code.")
    else:
        print("The installed GPGME Python bindings are a released version.")
except Exception as e:
    print(e)

try:
    if gpg.version.versionintlist[0] == 1:

```

```

if gpg.version.versionintlist[1] == 12:
    if gpg.version.versionintlist[2] == 1:
        print("This is the minimum version for using versionintlist.")
    elif gpg.version.versionintlist[2] > 1:
        print("The versionintlist method is available.")
    else:
        pass
elif gpg.version.versionintlist[1] > 12:
    print("The versionintlist method is available.")
else:
    pass
elif gpg.version.versionintlist[0] > 1:
    print("The versionintlist method is available.")
else:
    pass
except Exception as e:
    print(e)
@end example

```

The points where @samp{pass} is used in the above example will most likely also produce an @samp{Exception} error since those results should only occur in versions which do not have the @samp{gpgme.version.is\_beta} and @samp{gpgme.version.versionintlist} methods available.

```

@node Copyright and Licensing
@chapter Copyright and Licensing

```

```

@menu
* Copyright::
* Draft Editions of this HOWTO::
* License GPL compatible::
@end menu

```

```

@node Copyright
@section Copyright

```

Copyright The GnuPG Project, 2018.

```

@node Draft Editions of this HOWTO
@section Draft Editions of this HOWTO

```

Draft editions of this HOWTO may be periodically available directly from the author at any of the following URLs:

```

@itemize
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto.html, GPGME Python Bindings HOWTO draft
(HTML single file, AWS S3 SSL)}

```

```
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto.html, GPGME Python Bindings HOWTO draft
(HTML single file, AWS S3 no SSL)}
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto-split/index.html, GPGME Python Bindings
HOWTO draft (HTML multiple files, AWS S3 SSL)}
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto/index.html, GPGME Python Bindings HOWTO
draft (HTML multiple files, AWS S3 no SSL)}
@end itemize
```

These draft versions have been generated from this document via GNU Emacs @uref{https://orgmode.org/, Org mode} to @samp{.texi} and @uref{https://www.gnu.org/software/texinfo/, GNU Texinfo} to HTML. Though it is likely that the specific @uref{https://files.au.adversary.org/crypto/gpgme-python-howto, file} @uref{http://files.au.adversary.org/crypto/gpgme-python-howto.org, version} used will be on the same server with the generated output formats. Occasionally I may include the Org mode generated XHTML versions:

```
@itemize
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto.xhtml, GPGME Python Bindings HOWTO draft
(HTML single file, AWS S3 SSL)}
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto.xhtml, GPGME Python Bindings HOWTO draft
(HTML single file, AWS S3 no SSL)}
@end itemize
```

That XHTML version, however, is exported in a way which inherits a colour scheme from @uref{https://github.com/holomorph/emacs-zenburn, the author's Emacs theme} (which is a higher contrast version of @uref{http://kippura.org/zenburnpage/, Zenburn} ported by @uref{https://github.com/holomorph, Holomorph}). So it's fine for people who prefer dark themed web pages, but not so great for everyone else.

The GNU Texinfo and reStructured Text versions ship with the software, while the GNU Emacs Info version is generated from the Texinfo version using GNU Texinfo or GNU Makeinfo. The Texinfo format is generated from the original Org mode source file in Org mode itself either within GNU Emacs or via the command line by invoking Emacs in batch mode:

```
@example
emacs gpgme-python-howto.org --batch -f org-texinfo-export-to-texinfo --kill
emacs gpgme-python-howto --batch -f org-texinfo-export-to-texinfo --kill
@end example
```

The reStructuredText format is also generated from the Org mode source

file, except it is generated using `@uref{https://pandoc.org, Pandoc}` with either of the following commands (depending on the filename):

```
@example
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto.org
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto
@end example
```

Note that the Org mode source files are identified as such via a mode line at the top of each file and have had their `@samp{.org}` file extensions dropped in order to make scripted generation of output formats easier and not require renaming files post-conversion.

Due to a bug in Org mode's texinfo conversion method, the recommended steps for generating the Texinfo files for all the files in the `@samp{lang/python/doc/src/}` directory are as follows:

```
@example
for x in * ; do
  emacs $x --batch -f org-texinfo-export-to-texinfo --kill
  cat $x.texi | sed -e 's/@@documentencoding UTF-8/@@documentencoding utf-8/g' > ../texinfo/$x.texi
  pandoc -f org -t rst+smart -o ../rst/$x.rst $x
done ;
rm -fv *.texi
cd ../texinfo
mkdir info
mkdir html
for x in *.texi ; do
  makeinfo -v $x
  makeinfo --html --no-split $x
done ;
mv *.info info/
mv *.html html/
@end example
```

This code snippet includes the generation of the reStructuredText files and would be expected to be run from the `@samp{doc/src/}` directory containing the Org mode source files. It also assumes that the commands are being run on POSIX compliant systems with basic tools like sed, the Bourne shell and GNU Emacs<sup>①</sup>. Okay, Emacs might not necessarily qualify as a basic tool, but it is common enough that having it installed on a system isn't too great an expectation, nor is it difficult to add to most POSIX systems, even if the users of those systems do not personally use it.) available. The code snippet also includes the steps for generating the Emacs Info files and HTML files from the Texinfo files. Using reStructuredText files with Sphinx is best left for the documentation of that project.

In addition to these there is a significantly less frequently updated

version as a HTML [@uref{https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html}](https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html), WebHelp site} (AWS S3 SSL); generated from DITA XML source files, which can be found in [@uref{https://dev.gnupg.org/source/gpgme/browse/ben%252Fhowto-dita/}](https://dev.gnupg.org/source/gpgme/browse/ben%252Fhowto-dita/), an alternative branch} of the GPGME git repository.

Various generated output formats may occasionally be found in subdirectories of the [@uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python}](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python), [gpgme-python](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/gpgme-python) directory. In particular within the [@uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita}](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita), [DITA](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita)}, [@uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst}](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst), [reStructuredText](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst)} and [@uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo}](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo), [Texinfo](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo)} subdirectories. The [@samp{rst}](https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst) directory contains output files generated with Sphinx and may include a considerable number of its possible output formats, but there are no guarantees as to how recent these are or even if they are present.

These draft editions are not official documents and the version of documentation in the master branch or which ships with released versions is the only official documentation. Nevertheless, these draft editions may occasionally be of use by providing more accessible web versions which are updated between releases. They are provided on the understanding that they may contain errors or may contain content subject to change prior to an official release.

[@node License GPL compatible](#)  
[@section License GPL compatible](#)

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This file is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, to the extent permitted by law; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

[@bye](#)  
# -\*- mode: org -\*-  
#+TITLE: What Was New in the GPGME Python Bindings and Documentation  
#+AUTHOR: Ben McGinnes  
#+LATEX\_COMPILER: xelatex  
#+LATEX\_CLASS: article  
#+LATEX\_CLASS\_OPTIONS: [12pt]  
#+LATEX\_HEADER: \usepackage{xltextra}  
#+LATEX\_HEADER: \usepackage[margin=1in]{geometry}  
#+LATEX\_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}  
#+LATEX\_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

\* What Was New

:PROPERTIES:

:CUSTOM\_ID: new-stuff

:END:

```
| Version:      | 0.0.1          |
| GPGME Version: | 1.13.0        |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |
| Language:     | Australian English, British English |
| xml:lang:     | en-AU, en-GB, en |
```

The following are all the past /What's New/ sections for the Python Bindings HOWTO and other documentation.

\*\* What Was New in GPGME 1120

:PROPERTIES:

:CUSTOM\_ID: gpgme-1-12-0

:END:

The most obviously new point for those reading this guide is this section on other new things, but that's hardly important. Not given all the other things which spurred the need for adding this section and its subsections.

\*\*\* New in GPGME 1120

:PROPERTIES:

:CUSTOM\_ID: new-stuff-1-12-0

:END:

There have been quite a number of additions to GPGME and the Python bindings to it since the last release of GPGME with versions 1.11.0 and 1.11.1 in April, 2018.

The bullet points of new additions are:

- an expanded section on [\[\[file:gpgme-python-howto#installation\]\]\[installing\]](#) and [\[\[file:gpgme-python-howto#snafu\]\]\[troubleshooting\]](#) the Python bindings.
- The release of Python 3.7.0; which appears to be working just fine with our bindings, in spite of intermittent reports of problems for many other Python projects with that new release.
- Python 3.7 has been moved to the head of the specified python versions list in the build process.

- In order to fix some other issues, there are certain underlying functions which are more exposed through the `gpg.Context()`, but ongoing documentation ought to clarify that or otherwise provide the best means of using the bindings. Some additions to `=gpg.core=` and the `=Context()=`, however, were intended (see below).
- Continuing work in identifying and confirming the cause of oft-reported `problems installing the Python bindings on Windows`.
- GSOC: Google's Surreptitiously Ordered Conscriptio ... erm ... oh, right; Google's Summer of Code. Though there were two hopeful candidates this year; only one ended up involved with the GnuPG Project directly, the other concentrated on an unrelated third party project with closer ties to one of the GNU/Linux distributions than to the GnuPG Project. Thus the Python bindings benefited from GSOC participant Jacob Adams, who added the `key_import` function; building on prior work by Tobias Mueller.
- Several new methods functions were added to the `gpg.Context()`, including: `key_import`, `key_export`, `key_export_minimal` and `key_export_secret`.
- Importing and exporting examples include versions integrated with Marcel Fest's recently released `HKP for Python` module. Some `additional notes on this module` are included at the end of the HOWTO.
- Instructions for dealing with semi-walled garden implementations like ProtonMail are also included. This is intended to make things a little easier when communicating with users of ProtonMail's services and should not be construed as an endorsement of said service. The GnuPG Project neither favours, nor disfavors ProtonMail and the majority of this deals with interacting with the ProtonMail keyserver.
- Semi-formalised the location where `draft versions` of this HOWTO may periodically be accessible. This is both for the reference of others and testing the publishing of the document itself. Renamed this file at around the same time.
- The Texinfo documentation build configuration has been replicated from the parent project in order to make to maintain consistency with that project (and actually ship with each release).
- a reStructuredText (`=.rst=`) version is also generated for Python developers more used to and comfortable with that format as it is the standard Python documentation format and Python developers may wish to use it with Sphinx. Please note that there has been no testing of the reStructuredText version with Sphinx at all. The reST file was generated by the simple expedient of using `Pandoc`.
- Added a new section for `advanced or experimental use`.
- Began the advanced use cases with `a section` on using the module with `Cython`.
- Added a number of new scripts to the `=example/howto=` directory;

some of which may be in advance of their planned sections of the HOWTO (and some are just there because it seemed like a good idea at the time).

- Cleaned up a lot of things under the hood.

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1.13.1

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## 1.81 util-linux 2.32.1-35.el8

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<signature of Ty Coon>, 1 April 1989
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Jean-loup Gailly      Mark Adler  
jloup@gzip.org      madler@alumni.caltech.edu

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-\*- org -\*-

#+TITLE: List of code with permissive licenses as used by GnuPG.

#+STARTUP: showall

\* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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## 1.83 memstrack 0.1.11 1.e18

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## 1.84 python-pip 22.0.4

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#### A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release | Derived | Year | Owner | GPL-            |
|---------|---------|------|-------|-----------------|
|         | from    |      |       | compatible? (1) |

|                |           |           |            |         |
|----------------|-----------|-----------|------------|---------|
| 0.9.0 thru 1.2 |           | 1991-1995 | CWI        | yes     |
| 1.3 thru 1.5.2 | 1.2       | 1995-1999 | CNRI       | yes     |
| 1.6            | 1.5.2     | 2000      | CNRI       | no      |
| 2.0            | 1.6       | 2000      | BeOpen.com | no      |
| 1.6.1          | 1.6       | 2001      | CNRI       | yes (2) |
| 2.1            | 2.0+1.6.1 | 2001      | PSF        | no      |
| 2.0.1          | 2.0+1.6.1 | 2001      | PSF        | yes     |
| 2.1.1          | 2.1+2.0.1 | 2001      | PSF        | yes     |
| 2.2            | 2.1.1     | 2001      | PSF        | yes     |
| 2.1.2          | 2.1.1     | 2002      | PSF        | yes     |
| 2.1.3          | 2.1.2     | 2002      | PSF        | yes     |
| 2.2.1          | 2.2       | 2002      | PSF        | yes     |
| 2.2.2          | 2.2.1     | 2002      | PSF        | yes     |
| 2.2.3          | 2.2.2     | 2003      | PSF        | yes     |
| 2.3            | 2.2.2     | 2002-2003 | PSF        | yes     |
| 2.3.1          | 2.3       | 2002-2003 | PSF        | yes     |
| 2.3.2          | 2.3.1     | 2002-2003 | PSF        | yes     |
| 2.3.3          | 2.3.2     | 2002-2003 | PSF        | yes     |
| 2.3.4          | 2.3.3     | 2004      | PSF        | yes     |
| 2.3.5          | 2.3.4     | 2005      | PSF        | yes     |
| 2.4            | 2.3       | 2004      | PSF        | yes     |
| 2.4.1          | 2.4       | 2005      | PSF        | yes     |
| 2.4.2          | 2.4.1     | 2005      | PSF        | yes     |
| 2.4.3          | 2.4.2     | 2006      | PSF        | yes     |
| 2.4.4          | 2.4.3     | 2006      | PSF        | yes     |
| 2.5            | 2.4       | 2006      | PSF        | yes     |
| 2.5.1          | 2.5       | 2007      | PSF        | yes     |
| 2.5.2          | 2.5.1     | 2008      | PSF        | yes     |
| 2.5.3          | 2.5.2     | 2008      | PSF        | yes     |
| 2.6            | 2.5       | 2008      | PSF        | yes     |
| 2.6.1          | 2.6       | 2008      | PSF        | yes     |
| 2.6.2          | 2.6.1     | 2009      | PSF        | yes     |
| 2.6.3          | 2.6.2     | 2009      | PSF        | yes     |
| 2.6.4          | 2.6.3     | 2009      | PSF        | yes     |
| 2.6.5          | 2.6.4     | 2010      | PSF        | yes     |
| 2.7            | 2.6       | 2010      | PSF        | yes     |

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(2) According to Richard Stallman, 1.6.1 is not GPL-compatible, because its license has a choice of law clause. According to

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Thanks to the many outside volunteers who have worked under Guido's direction to make these releases possible.

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This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication.

Just configure this file as the SSLCACertificateFile.#

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
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|-------|-------|-----------|-----|-----|
| 2.2.3 | 2.2.2 | 2003      | PSF | yes |
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| 2.3.1 | 2.3   | 2002-2003 | PSF | yes |
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| 2.3.4 | 2.3.3 | 2004      | PSF | yes |
| 2.3.5 | 2.3.4 | 2005      | PSF | yes |
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#### A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a

non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 2.1.2          | 2.1.1        | 2002      | PSF        | yes                 |
| 2.1.3          | 2.1.2        | 2002      | PSF        | yes                 |
| 2.2 and above  | 2.1.1        | 2001-now  | PSF        | yes                 |

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# 1.86 zlib 1.2.11-18.el8\_5

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# 1.87 typing-extensions 4.3.0

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A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope

Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 2.1.2          | 2.1.1        | 2002      | PSF        | yes                 |
| 2.1.3          | 2.1.2        | 2002      | PSF        | yes                 |
| 2.2 and above  | 2.1.1        | 2001-now  | PSF        | yes                 |

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Thanks to the many outside volunteers who have worked under Guido's direction to make these releases possible.

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```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
```

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# 1.89 selinux 2.9-5.el8

## 1.89.1 Available under license :

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```
#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris dbgd Policy Rules.</summary>

#####
## <summary>
##   Write dbgd /var/run socket file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dbgd_var_sock_write`,
    gen_require(`
        type polaris_dbgd_t;
        type polaris_dbgd_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_dbgd_var_run_t)
    allow $1 polaris_dbgd_t:unix_stream_socket { connectto };
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbgd.if

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```
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#
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#

## <summary>Polaris cpp_stats Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppstats.if

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#

# November 2020, Christine Hwang

#

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#

# Map GNSS TTY to correct device context

/dev/ttyS1 -c gen\_context(system\_u:object\_r:polaris\_cabo\_gnss\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscabognss.fc

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisnginx, 1.0);

gen\_require(`

type polaris\_nginx\_t;

`)

polaris\_btrace\_data\_manage(polaris\_nginx\_t)

polaris\_chasfs\_manage(polaris\_nginx\_t)

polaris\_tdlresolve\_read(polaris\_nginx\_t)

polaris\_tdlldb\_list\_dirs(polaris\_nginx\_t)

polaris\_cpld\_read(polaris\_nginx\_t)

polaris\_lua\_read(polaris\_nginx\_t)

polaris\_flashlib\_read(polaris\_nginx\_t)

polaris\_crft\_data\_manage(polaris\_nginx\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_nginx\_t)

polaris\_lua\_read(polaris\_nginx\_t)

polaris\_disk\_harddisk\_read\_Ink(polaris\_nginx\_t)

allow polaris\_nginx\_t self:tcp\_socket { bind create listen accept setopt getopt shutdown};

allow polaris\_nginx\_t self:capability2 block\_suspend;

allow polaris\_nginx\_t self:capability { setgid setuid sys\_resource };

```

polaris_lfts_dev_use(polaris_nginx_t)
logging_send_syslog_msg(polaris_nginx_t)

corenet_tcp_connect_http_port(polaris_nginx_t)
corenet_tcp_bind_generic_node(polaris_nginx_t)
corenet_tcp_bind_http_port(polaris_nginx_t)
corenet_tcp_connect_pkiserver_port(polaris_nginx_t)
# FIXME: add interface to allow bind to port 1025-65535
corenet_tcp_bind_all_ports(polaris_nginx_t)
#Allow the nginx to search/read the web servers config files
apache_read_config(polaris_nginx_t)
apache_search_config(polaris_nginx_t)
# allow read httpd_sys_content_t (/var/www/...)
apache_read_sys_content(polaris_nginx_t)

gen_require(
    type httpd_var_run_t;
    type syslogd_var_run_t;
)
setattr_dirs_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_dirs_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_files_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_sock_files_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
files_pid_filetrans(polaris_nginx_t, httpd_var_run_t, { file sock_file dir unix_stream_socket })

polaris_socketat_nsfs_read(polaris_nginx_t)
# socketat does setsockopt SO_VRF
allow polaris_nginx_t self:capability net_admin;
auth_use_nsswitch(polaris_nginx_t)

allow polaris_nginx_t tmp_t:dir create_dir_perms;
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "ngx_access.log")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "ngx_error.log")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.pid")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.accept")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.cookie_tbl")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.login_count")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "openresty.log")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "ngxcsrcf.log")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "ngxttest.log")
create_dirs_pattern(polaris_nginx_t, httpd_log_t, httpd_log_t)
manage_files_pattern(polaris_nginx_t, httpd_log_t, httpd_log_t)
apache_read_log(polaris_nginx_t)
apache_write_log(polaris_nginx_t)

polaris_restconf_tmp_use(polaris_nginx_t)
dev_read_sysfs(polaris_nginx_t)

```

```

# dev/zram0 needs fs_t.filesystem getattr
ifdef(`quake_platform',`
fs_getattr_xattr_fs(polaris_nginx_t)
')

type polaris_nginx_tmp_t;
files_tmp_file(polaris_nginx_tmp_t)
manage_files_pattern(polaris_nginx_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
manage_dirs_pattern(polaris_nginx_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_aaa")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_master")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_session")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "ciscosdwan.cfg")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "proxy_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "client_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "fastcgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "scgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "uwsgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "pki")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "auth")

polaris_restconf_read(polaris_nginx_t)

#####
# webui_helper.sh/webui_helper_upgrade.sh
#####

polaris_process_domain_template(nginx_webui)
polaris_process_domain_template(nginx_webui_install)

polaris_nginx_exec_domain(polaris_nginx_webui_t, polaris_nginx_webui_exec_t)
polaris_nginx_exec_domain(polaris_nginx_webui_install_t, polaris_nginx_webui_install_exec_t)

corecmd_exec_bin(polaris_nginx_webui_t)
corecmd_exec_bin(polaris_nginx_webui_install_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_nginx_webui_t)
auth_use_nsswitch(polaris_nginx_webui_install_t)

#allow polaris_nginx_webui_t/polaris_nginx_webui_install_t access to nginx webui /tmp base folder
# /tmp/nginx/webui_tmp
manage_files_pattern(polaris_nginx_webui_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
manage_files_pattern(polaris_nginx_webui_install_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)

#allow polaris_file_transfer_client_t to access nginx webui /tmp base folder
# /tmp/nginx/webui_tmp. We also need to allow chvrf to use the FIFO in cases

```

```

# where we use the VRF interface
gen_require(
    type polaris_file_transfer_client_t;
    type polaris_chvrf_t;
)
manage_files_pattern(polaris_file_transfer_client_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
manage_fifo_files_pattern(polaris_file_transfer_client_t, polaris_nginx_t, polaris_nginx_t)
manage_fifo_files_pattern(polaris_chvrf_t, polaris_nginx_t, polaris_nginx_t)

#fts_client binary requires access to chassis, tdlresolve and cpld
polaris_tdlresolve_read(polaris_file_transfer_client_t)
polaris_chasfs_manage(polaris_file_transfer_client_t)
polaris_cpld_read(polaris_file_transfer_client_t, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)

gen_require(
    type polaris_file_transfer_client_exec_t;
)
polaris_bexecute_domain(polaris_file_transfer_client_t, polaris_file_transfer_client_exec_t)

type polaris_fts_client_tmp_t;
files_tmp_file(polaris_fts_client_tmp_t)
polaris_fts_client_tmp_manage(polaris_file_transfer_client_t)

# on ultra /var/www directory created by systemd unit that runs /mount_packages.sh
# under unconfined_service_t domain
gen_require(
    type unconfined_service_t;
)
files_var_filetrans(unconfined_service_t, httpd_sys_content_t, dir, "www")

allow polaris_nginx_t self:capability dac_override;

#iox local mgr in webui connects to caf service on port 8098
corenet_tcp_connect_polaris_caf_api_port(polaris_nginx_t)

# IOx downloads the application package using network protocol (e.g http)
gen_require(
    type fifo_var_run_t;
)
allow polaris_file_transfer_client_t fifo_var_run_t:fifo_file read;

# webui connects to dbm backend service on port 9090
corenet_tcp_connect_polaris_wnc_mgrd_port(polaris_nginx_t)

# webui connects to poljvm service on port 9093
corenet_tcp_connect_polaris_poljvm_websocket_port(polaris_nginx_t)

# remote docker workflow

```

```

corenet_tcp_connect_us_cli_port(polaris_nginx_t)

# webui sw mgmt app which does install and smu, invokes webui helper shell
# scripts which inturn invoke installer scripts. Hence need to provide transition
# rule to polaris_install_engine_t domain
polaris_install_engine_domtrans(polaris_nginx_webui_install_t)
polaris_install_show_domtrans(polaris_nginx_webui_install_t)

# Allow pipe operations during install command invocation
polaris_nginx_manage_fifo_files(polaris_bexecute_t)
polaris_nginx_manage_fifo_files(polaris_code_verify_t)
polaris_nginx_manage_fifo_files(polaris_install_engine_t)
polaris_nginx_manage_fifo_files(polaris_install_show_t)
polaris_nginx_manage_fifo_files(rsync_t)

# During install-add via WebUI, code_sign_verify generates a file:map denial
# "/usr/bin/code_sign_verify package
# /tmp/patch/smus/10_vwlc_apsp_ap3g3_17.6.bin/mount/C9800-CL-mono-patch.2021-01-11_11.31_radonep"
require {
    type etc_runtime_t;
}
allow polaris_code_verify_t etc_runtime_t:file map;

# Provide sys_resource capability to webui install scripts for sys_pipe calls.
allow polaris_nginx_webui_install_t self:capability sys_resource;

# nginx/webui File-manager app provides bootflash file-mgmt facility.
# as part of this it needs RW access to bootflash.
# TODO: Bug CSCvp83328 to isolate the access to another utility, which
# can have its own domain and nginx_t can transition to it.
polaris_bootflash_manage(polaris_nginx_t)

# allow nginx to manage core files
polaris_core_file_manage(polaris_nginx_t)

# luajit module for nginx triggers execmem denial due to mprotect call.
# TODO: cdets CSCvp70095 is used to track this vulnerability in
# current nginx component.
allow polaris_nginx_t self:process execmem;

# FIXME : allow shell/binary execution
# Elevated privelage needs to be addressed
# Tracked by Bugid : CSCvp93448
corecmd_exec_bin(polaris_nginx_t)
corecmd_exec_shell(polaris_nginx_t)

#FIXME
# Need to re-evaluate these privileges

```

```

#Tracked by Bugid : CSCvp92908, CSCvt81963(fts_client)
polaris_file_transfer_client_domtrans(polaris_nginx_webui_install_t)
# nginx need access btrace fifo file:
polaris_use_btrace_fifo(polaris_nginx_t)
gen_require(
    type proc_t;
)
manage_files_pattern(polaris_nginx_t, polaris_nginx_t, polaris_nginx_t)
allow polaris_nginx_t proc_t:filesystem { associate };
# nginx needs access to /dev/stdout which is owned by pman
allow polaris_nginx_t polaris_pman_t:fifo_file open;

#####
# aireos_translate_helper.sh
# Invokes a python library that converts aireos config to ewlc config.
#####
type polaris_aireos_translator_scripts_t;
files_type(polaris_aireos_translator_scripts_t)
polaris_process_domain_template(nginx_webui_aireos_translator)
polaris_nginx_exec_domain(polaris_nginx_webui_aireos_translator_t,
polaris_nginx_webui_aireos_translator_exec_t)
allow polaris_nginx_t polaris_aireos_translator_scripts_t:dir { getattr open read search };
allow polaris_nginx_t polaris_aireos_translator_scripts_t:file { getattr ioctl open read };
allow polaris_nginx_t polaris_nginx_webui_aireos_translator_exec_t:file ioctl;
allow polaris_nginx_t self:process setfscreate;
files_list_var(polaris_nginx_t)

#####
# ra_trace_webui_helper.sh
# Invokes mcp_trace_filter.sh to perform radio active tracing.
#####
polaris_process_domain_template(nginx_webui_trace_filter)
polaris_nginx_exec_domain(polaris_nginx_webui_trace_filter_t, polaris_nginx_webui_trace_filter_exec_t)
corecmd_exec_bin(polaris_nginx_webui_trace_filter_t)
manage_files_pattern(polaris_nginx_webui_trace_filter_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
manage_dirs_pattern(polaris_nginx_webui_trace_filter_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
auth_use_nsswitch(polaris_nginx_webui_trace_filter_t)
polaris_trace_filter_domtrans(polaris_nginx_webui_trace_filter_t)
polaris_nginx_manage_fifo_files(polaris_trace_filter_t)

#####
# nginx_helper.sh
#nginx show command helper run by pman invoking curl
#####
polaris_utility_domain_template(nginx_helper)
polaris_pman_entry(polaris_nginx_helper_t, polaris_nginx_helper_exec_t)

```

```

#allow execution of nginx_helper.sh
corecmd_exec_bin(polaris_nginx_helper_t)

#allow read of /etc/passwd
auth_use_nsswitch(polaris_nginx_helper_t)

#allow access to the tmp fifo file
polaris_use_btrace_fifo(polaris_nginx_helper_t)

# nginx_helper.sh reads from chasfs
polaris_chasfs_manage(polaris_nginx_helper_t)

gen_require(
    type polaris_curl_t;
)

# allow execution of /usr/bin/curl on the pkiserver port
polaris_curl_domtrans(polaris_nginx_helper_t)
corenet_tcp_connect_pkiserver_port(polaris_curl_t)

#allow curl to write into chasfs
polaris_chasfs_manage(polaris_curl_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnginx.te
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#
# July 2017, Victor Kamensky
#
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#

## <summary>Polaris cpp_cdm Policy Rules.</summary>

#####
## <summary>
##   Allow access to semaphore with type polaris_cpp_cdm_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cdm_sem_use',`
    gen_require(

```

```

        type polaris_cpp_cdm_t;
    ')
    allow $1 polaris_cpp_cdm_t:sem rw_sem_perms;
')

#####
## <summary>
##   Allow access to shared memory with type polaris_cpp_cdm_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cdm_shm_use`,`
    gen_require(`
        type polaris_cpp_cdm_t;
    `)
    allow $1 polaris_cpp_cdm_t:shm rw_shm_perms;
)

```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcdm.if

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```

#
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#
## <summary>Polaris dmi_ndbmand Policy Rules.</summary>

```

```

#####
## <summary>
##   Work with NDBLOAD_LOCK_PATH.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ndbload_lock_use`,`
    gen_require(`
        type polaris_dmi_ndbutil_lock_t;
    `)

```

```

        type tmp_t;
    )
    manage_files_pattern($1, tmp_t, polaris_dmi_ndbutil_lock_t)
    files_tmp_filetrans($1, polaris_dmi_ndbutil_lock_t, file, ".l.ndbutil-load")
    files_tmp_filetrans($1, polaris_dmi_ndbutil_lock_t, file, ".l.ndbutil-use")
)

#####
## <summary>
##   Manage polaris_ndbmand_ndbutil_t files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ndbmand_ndbutil_manage`,
    gen_require(`
        type polaris_ndbmand_ndbutil_t;
        type polaris_confd_ndbutil_lock_t;
    `)
    manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_ndbmand_ndbutil_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.if

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```

#
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#
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#
## <summary>Polaris sif_mgr Policy Rules.</summary>

```

```

#####
## <summary>
##   Allow the specified domain able to read sif_mgr /tmp files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="object">

```

```

## <summary>
## File name in /tmp that the sif_mgr domain creates and other domains
## access.
## </summary>
## </param>
#
interface(`polaris_sif_mgr_tmp_files_read`,`
    gen_require(`
        type polaris_sif_mgr_tmp_t;
    `)

    read_files_pattern($1, polaris_sif_mgr_tmp_t, polaris_sif_mgr_tmp_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissifmgr.if
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```

```

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#

```

```

## <summary>Polaris Chasfs Policy Rules.</summary>

```

```

#####
# Chasfs policy
#####

```

```

#####

```

```

## <summary>
## Manage chasfs files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasfs_manage`,`
    gen_require(`
        type polaris_chasfs_t;
    `)

    manage_dirs_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
    manage_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)

```

```

manage_lnk_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
manage_fifo_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
manage_sock_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)

allow $1 polaris_chasfs_t:{file dir} watch;

# chasfs contains a lot of weird permission files
allow $1 self:capability dac_read_search;
)

```

```
#####
```

```

## <summary>
##   Read chasfs files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_chasfs_read`,`
gen_require(`
type polaris_chasfs_t;
)
list_dirs_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_lnk_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_fifo_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_sock_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)

allow $1 polaris_chasfs_t:{file dir} watch;

# chasfs contains a lot of weird permission files
allow $1 self:capability dac_read_search;
)

```

```
#####
```

```

## <summary>
##   Manage chasync file(user_input_custom.xml)
## </summary>
## <param name="domain">
##   <summary>
##     getattr allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```
interface(`polaris_chasync_files_manage`,`
    gen_require(`
        type polaris_chasync_files_t;
    `)
    manage_files_pattern($1, polaris_chasync_files_t, polaris_chasync_files_t)
`)
```

```
#####
```

```
## <summary>
##   Watch read chasfs directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasfs_watch_read`,`
    gen_require(`
        type polaris_chasfs_t;
    `)
    allow $1 polaris_chasfs_t:dir watch_reads;
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarischasfs.if
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```

```
#
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#
```

```
/dev/dev_lfts -c gen_context(system_u:object_r:polaris_lfts_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislfts.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
```

## <summary>Polaris GR Manager Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.if

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#

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#

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#

policy\_module(polarisngwc, 1.0);

# chdrvmmmap device (MMAP Driver for ASIC Memory mapping)

type polaris\_chdrvmmmap\_device\_t;

dev\_node(polaris\_chdrvmmmap\_device\_t)

# gettysburg\_fpga device (/dev/gettysburg\_dev1)

type polaris\_gettysburg\_fpga\_device\_t;

dev\_node(polaris\_gettysburg\_fpga\_device\_t)

# dplr io memory maping driver /dev/cisco/dplriomem

type polaris\_dplr\_iomem\_mmapdrv\_device\_t;

dev\_node(polaris\_dplr\_iomem\_mmapdrv\_device\_t)

# /dev/shm/ngwc\_shm shared memory

type polaris\_ngwc\_shm\_t;

files\_type(polaris\_ngwc\_shm\_t)

# /dev/shm/ngwc\_scc\_shm shared memory

type polaris\_ngwc\_scc\_shm\_t;

files\_type(polaris\_ngwc\_scc\_shm\_t)

# /dev/shm/iomd\_to\_fed\_ptp\_offload shared memory

type polaris\_ngwc\_itfpo\_t;

files\_type(polaris\_ngwc\_itfpo\_t)

# /dev/shm/sdm shared memory

type polaris\_sdm\_shm\_t;

files\_type(polaris\_sdm\_shm\_t)

# /dev/shm/sem.i2c\_sem00N quake sempaphor

type polaris\_quake\_i2c\_t;

files\_type(polaris\_quake\_i2c\_t)

```

#FPGA io memory mapping driver /dev/cisco/fpgaiomem
type polaris_fpga_iomem_mmapfpga_device_t;
dev_node(polaris_fpga_iomem_mmapfpga_device_t)

# Mapping permission for /dev/shm/<name>
ifdef(`quake_platform',`
gen_require(
    type systemd_tmpfiles_t;
    )
mmap_files_pattern(systemd_tmpfiles_t, polaris_quake_i2c_t, polaris_quake_i2c_t)
')

# In combined image we have several policies and we choose
# one to use in run-time, but file system is shared and
# labeled with different file_context files, so it is
# possible that we may have some labels that other policy
# does not understand for now just hard missing entries
ifdef(`nyquist_platform',`
type polaris_cm_cc_exec_t;
files_type(polaris_cm_cc_exec_t)
type polaris_cm_fp_exec_t;
files_type(polaris_cm_fp_exec_t)
type polaris_flashcheck_exec_t;
files_type(polaris_flashcheck_exec_t)
type polaris_emd_exec_t;
files_type(polaris_emd_exec_t)
type polaris_ngwc_ishow_exec_t;
files_type(polaris_ngwc_ishow_exec_t)

# Adding here as this unmount command is specific to Nyquist platform.
# /bin/cat9k_ssd_auth_cmds.sh
polaris_utility_domain_template(ssd_unmount)
corecmd_exec_bin(polaris_ssd_unmount_t)
storage_getattr_fixed_disk_dev(polaris_ssd_unmount_t)
fstools_domtrans(polaris_ssd_unmount_t)
mount_domtrans(polaris_ssd_unmount_t)
polaris_use_btrace_fifo(polaris_ssd_unmount_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_ssd_unmount_t)
polaris_chasfs_read(polaris_ssd_unmount_t)
polaris_cpld_read(polaris_ssd_unmount_t)

#Read /tmp/sw/boot files
polaris_boot_tmp_read(polaris_ssd_unmount_t)
# Allow read to btrace tmp files
polaris_btrace_tmppub_read(polaris_ssd_unmount_t)
# Allow getattr to tmpfs

```

```

fs_getattr_tmpfs(polaris_ssd_unmount_t)
# Allow read to ssd auth tmp files /tmp/ssd_blk_device created by udev
polaris_read_ssd_tmp_files(polaris_ssd_unmount_t)

# allow creation/access of temporary files created by bash such as
# /tmp/sh-thd-1499428203 etc
type polaris_ssd_unmount_tmp_t;
files_tmp_file(polaris_ssd_unmount_tmp_t)
files_tmp_filetrans(polaris_ssd_unmount_t, polaris_ssd_unmount_tmp_t, file)
manage_files_pattern(polaris_ssd_unmount_t, polaris_ssd_unmount_tmp_t, polaris_ssd_unmount_tmp_t)
allow polaris_ssd_unmount_t polaris_ssd_unmount_tmp_t:file { unlink };

#Allow nfs dir/file read
rpc_manage_nfs_state_data_dir(polaris_ssd_unmount_t)
rpc_manage_nfs_state_data(polaris_ssd_unmount_t)
#Allow read access to files on nfsd file system
fs_read_nfsd_files(polaris_ssd_unmount_t)
kernel_rw_rpc_sysctls(polaris_ssd_unmount_t)
fs_getattr_xattr_fs(polaris_ssd_unmount_t)

# allow create/sendto/connect operations for logger
allow polaris_ssd_unmount_t self:unix_dgram_socket sendto;
allow polaris_ssd_unmount_t self:unix_dgram_socket create_socket_perms;
logging_create_devlog_dev(polaris_ssd_unmount_t)
logging_send_syslog_msg(polaris_ssd_unmount_t)
polaris_persistent_getattr(polaris_ssd_unmount_t)
#allow dir:search getattr read for udev tmp files
#allow file:write open for udev tmp files
polaris_udev_tmp_manage(polaris_ssd_unmount_t)
gen_require(`
    type rsync_exec_t;
    type rsync_port_t;
`)
#allow tcp_socket:name_connect for rsync_port_t
#polaris_ssd_unmount_t has superset privileges of rsync, so its good
#to run rsync in unmount domain. This is not the case everywhere. Please use
#corenet_tcp_connect_rsync_port if rsync needs to be run in its own domain
allow polaris_ssd_unmount_t rsync_port_t:tcp_socket name_connect;
#allow file:get_attr exec read open map execute_no_trans for rsync_exec_t
allow polaris_ssd_unmount_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
#allow dir:getattr for removable_t
polaris_getattr_removable(polaris_ssd_unmount_t)
`)
ifdef(`passport_platform',`
type polaris_auto_upgrade_server_rp_exec_t;
files_type(polaris_auto_upgrade_server_rp_exec_t)
type polaris_bt_logger_exec_t;
files_type(polaris_bt_logger_exec_t)

```

```

type polaris_cmm_exec_t;
files_type(polaris_cmm_exec_t)
type polaris_ngwc_plfm_mgr_exec_t;
files_type(polaris_ngwc_plfm_mgr_exec_t)
type polaris_sif_mgr_exec_t;
files_type(polaris_sif_mgr_exec_t)
type polaris_torch_exec_t;
files_type(polaris_torch_exec_t)
type polaris_xcvr_test_exec_t;
files_type(polaris_xcvr_test_exec_t)
type polaris_faked_exec_t;
files_type(polaris_faked_exec_t)
type polaris_emd_exec_t;
files_type(polaris_emd_exec_t)
type polaris_ngwc_ishow_exec_t;
files_type(polaris_ngwc_ishow_exec_t)
type polaris_gr_mgr_exec_t;
files_type(polaris_gr_mgr_exec_t)
type polaris_ioxss_rp_exec_t;
files_type(polaris_ioxss_rp_exec_t)
')
ifdef(`starfleet_platform',`
type polaris_xcvr_test_exec_t;
files_type(polaris_xcvr_test_exec_t)
type polaris_auto_upgrade_server_rp_exec_t;
files_type(polaris_auto_upgrade_server_rp_exec_t)
type polaris_bt_logger_exec_t;
files_type(polaris_bt_logger_exec_t)
type polaris_cmm_exec_t;
files_type(polaris_cmm_exec_t)
type polaris_ngwc_plfm_mgr_exec_t;
files_type(polaris_ngwc_plfm_mgr_exec_t)
type polaris_sif_mgr_exec_t;
files_type(polaris_sif_mgr_exec_t);
type polaris_torch_exec_t;
files_type(polaris_torch_exec_t);
')

type polaris_disk_ucode0_t;
files_type(polaris_disk_ucode0_t);

type polaris_nplum_power_file_t;
polaris_pfile_type(polaris_nplum_power_file_t)

#permission for /unicode0
optional_policy(`
    gen_require(`
        type polaris_periodic_t;

```

```
)
polaris_disk_ucose0_read_Ink(polaris_periodic_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwc.te

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```
#
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#
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#

## <summary>Polaris cfmgr Policy Rules.</summary>
```

```
#####
```

```
## <summary>
##   Write cfmgr /var/run socket file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cfmgr_var_sock_write`,`
    gen_require(`
        type polaris_cfmgr_t;
        type polaris_cfmgr_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_cfmgr_var_run_t)
    allow $1 polaris_cfmgr_t:unix_stream_socket { connectto };
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfmgr.if

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```
#
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#
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#
```

```

policy_module(polarisstackmgr, 1.0);

gen_require(
    type polaris_stack_mgr_t;
)
polaris_btrace_data_manage(polaris_stack_mgr_t)
polaris_crft_data_manage(polaris_stack_mgr_t)
polaris_chasfs_manage(polaris_stack_mgr_t)
polaris_tdlresolve_read(polaris_stack_mgr_t)
polaris_tdlldb_list_dirs(polaris_stack_mgr_t)
polaris_cpld_read(polaris_stack_mgr_t)
polaris_lua_read(polaris_stack_mgr_t)
polaris_flashlib_read(polaris_stack_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_stack_mgr_t)

polaris_db_tdlldb_dir_use(polaris_stack_mgr_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_stack_mgr_t)

allow polaris_stack_mgr_t self:capability { dac_override };

polaris_dyncfg_tmp_read(polaris_stack_mgr_t)

corecmd_exec_bin(polaris_stack_mgr_t)
corecmd_exec_shell(polaris_stack_mgr_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_stack_mgr_t)

# read /proc/cmdline
kernel_read_system_state(polaris_stack_mgr_t)

# open /dev/ttyS0 console in stack_console_write_init
term_use_unallocated_ttys(polaris_stack_mgr_t)

# on ngwc/vwlc FIPS code reads /tmp/hw_entropy
polaris_hw_entropy_use(polaris_stack_mgr_t)

#stackmgr runs mcp_trace_request.sh
polaris_trace_request_domtrans(polaris_stack_mgr_t)

#stack_mgr needs to be able to access /tmp/issu_stk/prst_sync_rld_info_prcsd
polaris_issu_stack_tmp_manage(polaris_stack_mgr_t)

# may use mcp_chvrf.sh to access other nodes in system.
# Note that we do not actually need to transition to the chvrf domain, however

```

```
# a file descriptor leak can occur and the domain transition permission macro
# expands to allow polaris_chvrf_t to access the fifo
polaris_chvrf_domtrans(polaris_stack_mgr_t)

#Allow read on bootflash to be able to read reload_history
polaris_bootflash_read(polaris_stack_mgr_t)

# stackmgr tmp files
type polaris_stack_mgr_tmp_t;
files_tmp_file(polaris_stack_mgr_tmp_t)
files_tmp_filetrans(polaris_stack_mgr_t, polaris_stack_mgr_tmp_t, file, "ngwc_reload_reason")
manage_files_pattern(polaris_stack_mgr_t, polaris_stack_mgr_tmp_t, polaris_stack_mgr_tmp_t)

allow polaris_stack_mgr_t self:capability sys_nice;
allow polaris_stack_mgr_t self:process setsched;
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.te

No license file was found, but licenses were detected in source scan.

```
#
# January 2018, Manohar Hungund
#
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#
```

```
# polarisoctdplogrp file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.fc

No license file was found, but licenses were detected in source scan.

```
#
# February 2020, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris cedge_start Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedgestart.if

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```
dnl
dnl April 2018, Victor Kamensky
```

```

dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
define(`polaris_mqipc_service_server_aux',`dnl
type $1;
polaris_mqipc_type($1)
polaris_mqipc_$2_create_name($3)

define(`polaris_mqipc_service_server',`dnl
polaris_mqipc_service_server_aux(mqipc_label($1), mqipc_stem($1), process_label($2))dnl
`)

define(`polaris_mqipc_service_client_aux',`dnl
polaris_mqipc_$2_use($3)

define(`polaris_mqipc_service_client',`dnl
polaris_mqipc_service_client_aux(mqipc_label($1), mqipc_stem($1), process_label($2))dnl
`)

define(`polaris_mqipc_service_server_elastic_client',`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_mqipc\_te.m4

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarisqfp Policy Rules.</summary>

#####
## <summary>
##   Work (read, write, ioctl) with /dev/netmap device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_netmap_dev_use',`
gen_require(`
    type device_t;

```

```

type polaris_netmap_device_t;
)
  write_chr_files_pattern($1, device_t, polaris_netmap_device_t)
  read_chr_files_pattern($1, device_t, polaris_netmap_device_t)
  allow $1 polaris_netmap_device_t:chr_file map;
)

```

```

#####
## <summary>
##   Work (read, write, ioctl) with /dev/svc_eng_puntNN devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_svc_eng_punt_dev_use`,`
  gen_require(`
    type device_t;
    type polaris_sep_device_t;
  `)
  write_chr_files_pattern($1, device_t, polaris_sep_device_t)
  read_chr_files_pattern($1, device_t, polaris_sep_device_t)
)

```

```

#####
## <summary>
##   Allow access to semaphore with type polaris_qfp_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_qfp_sem_use`,`
  gen_require(`
    type polaris_qfp_t;
  `)
  allow $1 polaris_qfp_t:sem rw_sem_perms;
)

```

```

#####
## <summary>
##   Send messages to qfp unix datagram sockets.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_qfp_dgram_send`,`
gen_require(`
type polaris_qfp_t;
`)

allow $1 polaris_qfp_t:unix_dgram_socket sendto;
`)

# CSR & C8KV infiniband devices in Azure
interface(`polaris_infiniband_dev_use`,`
gen_require(`
type device_t;
type polaris_infiniband_device_t;
`)
write_chr_files_pattern($1, device_t, polaris_infiniband_device_t)
read_chr_files_pattern($1, device_t, polaris_infiniband_device_t)
allow $1 polaris_infiniband_device_t:chr_file map;
`)

#####
## <summary>
## Execute iodbd.sh script in the polaris_iodbd_t domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_iodbd_domtrans`,`
gen_require(`
type polaris_iodbd_t, polaris_iodbd_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_iodbd_exec_t, polaris_iodbd_t)
`)

#####
## <summary>
## Manage files and directoris under /tmp/iodb
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_iodb_tmp_manage`,`
    gen_require(`
        type polaris_iodb_tmp_t;
    `)

    manage_files_pattern($1, polaris_iodb_tmp_t,polaris_iodb_tmp_t)
    manage_dirs_pattern($1, polaris_iodb_tmp_t, polaris_iodb_tmp_t)

    fs_getattr_tmpfs($1)
)

#####
## <summary>
## Manage files and directoris under /tmp/memif
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_qfp_memif_manage`,`
    gen_require(`
        type polaris_qfp_memif_t;
    `)
    manage_files_pattern($1, polaris_qfp_memif_t, polaris_qfp_memif_t)
    manage_sock_files_pattern($1, polaris_qfp_memif_t, polaris_qfp_memif_t)
    gen_require(`
        type tmp_t;
    `)
    manage_dirs_pattern($1, { tmp_t polaris_qfp_memif_t }, polaris_qfp_memif_t)
    allow $1 polaris_qfp_memif_t:file map;
)

#####
## <summary>
## polaris_qfp_log_manage
## </summary>
## <param name="filename">
## <summary>
## Name of the file being managed.

```

```

## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_qfp_log_manage`,`
    type polaris_qfp_var_log_t;
    logging_log_file(polaris_qfp_var_log_t)
    logging_log_filetrans(polaris_qfp_t, polaris_qfp_var_log_t, file, $1)
    manage_files_pattern(polaris_qfp_t, var_log_t, polaris_qfp_var_log_t)
`)

```

```

#####
## <summary>
## Work (read, write, ioctl) with /dev/icp_adf_ctl and
## /dev/icp_dev_mem devices
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_icp_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_icp_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_icp_device_t)
    read_chr_files_pattern($1, device_t, polaris_icp_device_t)
    allow $1 polaris_icp_device_t:chr_file map;
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisqfp.if

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```

#
# March 2017, Victor Kamensky
#
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#

```

```

/usr/binos/bin/*.linux_iosd.*ms -- gen_context(system_u:object_r:polaris_iosd_exec_t,s0)
/usr/binos/bin/mcpcc-lc-ms -- gen_context(system_u:object_r:polaris_iosd_exec_t,s0)

```

```

/tmp/boottime gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)
/tmp/booted gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)

```

```
/tmp/restconf(/.*)?      gen_context(system_u:object_r:polaris_restconf_tmp_t,s0)

/tmp/netio0(/.*)?        gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)
/tmp/nginx.conf          gen_context(system_u:object_r:httpd_config_t,s0)

/bootflash/.geo(/.*)?    gen_context(system_u:object_r:polaris_geodb_files_t,s0)
/harddisk/.geo(/.*)?    gen_context(system_u:object_r:polaris_geodb_files_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiosd.fc

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```
#
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#
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#

## <summary>Polaris cli_agent Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscliagent.if

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Shawn Lu
#
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#

# polarisrogued file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrogued.fc

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```
#
# July 2017, Victor Kamensky
#
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#

## <summary>Polaris MCP Platform Policy Rules.</summary>
```

```
#####
```

```

## <summary>
##   Work (read, write, ioctl) with /dev/scooby
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_scooby_dev_use`,`
gen_require(`
    type device_t;
    type polaris_scooby_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_scooby_device_t)
    read_chr_files_pattern($1, device_t, polaris_scooby_device_t)
`)

```

#####

```

## <summary>
##   Work (read, write, ioctl) with /dev/spa[0123]
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_spa_dev_use`,`
gen_require(`
    type device_t;
    type polaris_spa_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_spa_device_t)
    read_chr_files_pattern($1, device_t, polaris_spa_device_t)
    allow $1 polaris_spa_device_t:chr_file map;
`)

```

#####

```

## <summary>
##   Work (read, write, ioctl) with /dev/htdp[0-9]*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_htdp_dev_use`,`
gen_require(`
    type device_t;
    type polaris_htdp_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_htdp_device_t)
    read_chr_files_pattern($1, device_t, polaris_htdp_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /sys/devices/virtual/sys_platform
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sysfs_platform_dev_use`,`
gen_require(`
    type polaris_sysfs_platform_t;
`)
    manage_files_pattern($1, polaris_sysfs_platform_t, polaris_sysfs_platform_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/ds31408
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ds31408_dev_use`,`
gen_require(`
    type device_t;
    type polaris_ds31408_device_t;
`)
    rw_chr_files_pattern($1, device_t, polaris_ds31408_device_t)
`)

#####
## <summary>
##   Allow access to /dev/cbdma
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cbdma_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_cbdma_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cbdma_device_t)
    read_chr_files_pattern($1, device_t, polaris_cbdma_device_t)
    allow $1 polaris_cbdma_device_t:chr_file map;
`)

#####
## <summary>
##   Allow access to /dev/cpp_htdp
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_htdp_dev_use`,`
    gen_require(`
        type polaris_cpp_htdp_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cpp_htdp_device_t)
    read_chr_files_pattern($1, device_t, polaris_cpp_htdp_device_t)
    allow $1 polaris_cpp_htdp_device_t:chr_file map;
`)

#####
## <summary>
##   Allow access to /dev/n2_device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_n2_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_n2_device_t;
    `)

```

```

    )
    write_chr_files_pattern($1, device_t, polaris_n2_device_t)
    read_chr_files_pattern($1, device_t, polaris_n2_device_t)
)

#####
## <summary>
##   Allow access to /dev/cy2213
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cy2213_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_cy2213_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cy2213_device_t)
    read_chr_files_pattern($1, device_t, polaris_cy2213_device_t)
)

#####
## <summary>
##   Allow access to /dev/vega
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vega_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_vega_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_vega_device_t)
    read_chr_files_pattern($1, device_t, polaris_vega_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dash_fpga device
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dash_dev_mcp_use`,`
gen_require(`
    type device_t;
    type polaris_dash_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_dash_device_t)
    read_chr_files_pattern($1, device_t, polaris_dash_device_t)
    allow $1 polaris_dash_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcp.if

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

dnl Crankshaft (Overlord, Utah and Fugazi) Platform Max Bay Limits

max\_bay\_map\_set(`rp`, `per\_bay`, 3)

max\_bay\_map\_set(`cc`, `per\_bay`, 3)

max\_bay\_map\_set(`fp`, `per\_bay`, 3)

max\_bay\_ripc\_map\_set(`rp`, `per\_bay`, 3)

max\_bay\_ripc\_map\_set(`cc`, `per\_bay`, 3)

max\_bay\_ripc\_map\_set(`fp`, `per\_bay`, 3)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/mcpmaps.m4

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisiosd, 1.0);

gen\_require(`

```

    type polaris_iosd_t;
)

#####
# mqipc manual, one that missing in platform tdl file
#####

ifdef(`nyquist_platform',`
gen_require(
    type polaris_bt_logger_iosd_mqipc_t;
)
# iosd may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_iosd_t, polaris_bt_logger_iosd_mqipc_t, bt_logger_iosd)
)

polaris_btrace_data_manage_all(polaris_iosd_t)
polaris_chasfs_manage(polaris_iosd_t)
polaris_tdlresolve_read(polaris_iosd_t)
polaris_tdlldb_list_dirs(polaris_iosd_t)
polaris_cpld_read(polaris_iosd_t)
polaris_lua_read(polaris_iosd_t)
polaris_flashlib_read(polaris_iosd_t)
polaris_crft_data_manage_all(polaris_iosd_t)
optional_policy(
polaris_gnmib_gnoi_images_manage(polaris_iosd_t)
)

polaris_ripc_sman_ui_serv_connect(polaris_iosd_t)

polaris_db_tdlldb_dir_use(polaris_iosd_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_iosd_t)

# allow iosd read/write via hostname <>
systemd_hostnamed_manage_config(polaris_iosd_t)

# creates /etc/netns/1/resolv.conf via ip domain-name <> command
# creates /etc/netns/vrf.VRFNAME via ip vfr VRFNAME command
# creates /etc/netns/vrf.VRFNAME/resolv.conf via ip
# domain-name vrf VRFNAME <> command
gen_require(
    type net_conf_t;
)
)
files_etc_filetrans(polaris_iosd_t, net_conf_t, file, "resolv.conf")
files_etc_filetrans(polaris_iosd_t, net_conf_t, file, "hosts")
files_etc_filetrans(polaris_iosd_t, net_conf_t, dir, "netns")
sysnet_manage_config(polaris_iosd_t)

```

```

sysnet_manage_config_dirs(polaris_iosd_t)

# for pluggable FS, allow iosd to access files on them.
polaris_getattr_removable(polaris_iosd_t)
polaris_removable_manage(polaris_iosd_t)
fs_read_removable_symlinks(polaris_iosd_t)

polaris_lsmpi_dev_use(polaris_iosd_t)
polaris_lsmpi_sysctl_read(polaris_iosd_t)
polaris_cfg_data_manage(polaris_iosd_t)
polaris_proc_rmonbifo_read(polaris_iosd_t)

polaris_icc_broken_relocations(polaris_iosd_t)

allow polaris_iosd_t self:capability { sys_nice chown fsetid sys_rawio dac_override dac_read_search ipc_lock };

gen_require(`
    type httpd_config_t;
    type tmp_t;
`)

# iosd creates /tmp/nginx.conf file
manage_files_pattern(polaris_iosd_t, tmp_t, httpd_config_t)
# transition nginx.conf into httpd_config_t
files_tmp_filetrans(polaris_iosd_t, httpd_config_t, file, "nginx.conf")
# RW access to /usr/binos/conf/nginx-conf/servers (utd feature)
manage_dirs_pattern(polaris_iosd_t, httpd_config_t, httpd_config_t)

#iosd create /tmp/nginx/cert/ca.cert
polaris_nginx_tmp_manage(polaris_iosd_t)

# !!!LOOK AT ME!!! - we allow iosd to read raw memory
# dev_read_raw_memory(polaris_iosd_t)

polaris_flashlib_write(polaris_iosd_t)
polaris_nvram_manage(polaris_iosd_t)
polaris_persistent_manage(polaris_iosd_t)

# smu management in iosd (linked in via libbcrdu.so) accesses
# files created by the installer under /tmp/patch
polaris_install_tmp_read(polaris_iosd_t)

optional_policy(`
polaris_cpp_tmp_ifdev_use(polaris_iosd_t)
`)

polaris_dyncfg_tmp_read(polaris_iosd_t)

```

```

# lsmapi_fetch_linux_ifindex tries to ioctl(skfd, SIOCGIFINDEX, &ifr) on
# non existent ethN interface, as result kernel triggers attempt to
# load kernel module that would correspond to such interface. Deny
# and don't audit iosd_t attempt to load kernel modules.
# LOOK AT ME: in long term we don't want iosd even try to load modules
# and we would actually would want to report and fail such
kernel_dontaudit_request_load_module(polaris_iosd_t)

# iosd calls nice function to change fast path priority (mcp_fastpath_thread_func)
allow polaris_iosd_t self:process setsched;

#ifdef(`crankshaft_family',`
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
')

#ifdef(`mcp_family',`
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
allow polaris_iosd_t polaris_iosd_t:tun_socket relabelfrom;
')

# on ultra iosd is figuring out parameters of interfaces of underlying
# hypervisors kvm, vmware, etc. See vxe_gethd_ifdb_scan
#ifdef(`crankshaft_family',`
dev_rw_sysfs(polaris_iosd_t)
polaris_disk_objstore_manage(polaris_iosd_t)
')
#ifdef(`vxe_family',`
dev_read_sysfs(polaris_iosd_t)
polaris_disk_objstore_manage(polaris_iosd_t)
polaris_objstore_sem_use(polaris_iosd_t)
')
#ifdef(`vwlc_platform',`
polaris_disk_objstore_manage(polaris_iosd_t)
optional_policy(`
    polaris_vwlc_grub_efi_use(polaris_iosd_t)
')
')
#ifdef(`wlc_family',`
dev_read_sysfs(polaris_iosd_t)
polaris_tlscd_uds_manage(polaris_iosd_t)
gen_require(`
    type polaris_tlscd_t;
')
allow polaris_iosd_t polaris_tlscd_t:unix_dgram_socket sendto;
')
# on 1ng mcpcc-lc-ms reads /sys/devices/system/cpu/online

```

```

ifdef(`mcp_family',`
dev_read_sysfs(polaris_iosd_t)
')
# neptune need to figure fan type by reading
# /sys/bus/platform/devices/nios/n2h_fan_ctrl_fan_tray_status
ifdef(`neptune_platform',`
dev_read_sysfs(polaris_iosd_t)
')
# radium need to figure fan type by reading
# /sys/bus/platform/devices/nios/n2h_fan_ctrl_fan_tray_status
ifdef(`radium_platform',`
dev_read_sysfs(polaris_iosd_t)
')
# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`quake_platform',`
dev_read_sysfs(polaris_iosd_t)
')
# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`supernova_platform',`
dev_read_sysfs(polaris_iosd_t)
')

# work with /tmp/boottime, /tmp/booted files: create/write
type polaris_iosd_tmp_files_t;
files_tmp_file(polaris_iosd_tmp_files_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, file, "boottime")
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, file, "booted")
create_files_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)

#allow polaris_iosd_t polaris_udev_tmp_files_t:dir { getattr open read search };
#allow polaris_iosd_t polaris_udev_tmp_files_t:file { open, read, write };
# LOOK AT ME (need to review write access with iosd team)
polaris_udev_tmp_manage(polaris_iosd_t)

# work with /tmp/restconf
type polaris_restconf_tmp_t;
files_tmp_file(polaris_restconf_tmp_t)
polaris_restconf_tmp_use(polaris_iosd_t)

files_tmp_filetrans(polaris_iosd_t, polaris_restconf_tmp_t, dir, "restconf")
filetrans_pattern(polaris_iosd_t, polaris_restconf_tmp_t, polaris_restconf_tmp_t, file)

# work with /tmp/netio0
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, dir, "netio0")
# sockets and dirs created under /tmp/netio0
manage_dirs_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)
manage_sock_files_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)
allow polaris_iosd_t self:unix_dgram_socket create_socket_perms;

```

```

gen_require(
    type inetd_child_t;
)
# sendto permission for /tmp/netio0/ttyC100
allow polaris_iosd_t inetd_child_t:unix_dgram_socket sendto;

polaris_socketat_nsfs_read(polaris_iosd_t)

# onep uses TIPC sockets see onep_tipc_transport_start
allow polaris_iosd_t self:socket { bind create listen accept getattr read write ioctl getopt setopt };

# mcp_eobc_create_socket creates UDP socket for eobc
corenet_udp_bind_polaris_iosd_eobc_port(polaris_iosd_t)
gen_require(
    type node_t;
)
allow polaris_iosd_t node_t:udp_socket node_bind;
allow polaris_iosd_t self:udp_socket { bind create ioctl setopt read write };

# direct access to serial TTY devices like /dev/ttyS1
term_use_unallocated_ttys(polaris_iosd_t)

# on ultra cvac_load_config function tried to access cdrom0:/iosxe_config.txt
# and if exists read
ifdef(`vxe_family',`
fs_read_iso9660_files(polaris_iosd_t)
)
ifdef(`wlc_family',`
fs_read_iso9660_files(polaris_iosd_t)
)

# ifs_get_free_bytes invokes mcp_fs_statfs and eventually mcp_wrapper_statvfs
# with "/bootflash"...this needs attr access for "/"
fs_getattr_xattr_fs(polaris_iosd_t)

# iosd works with cpp /dev/shm//cpp_ifdev_shmem shared mmory
optional_policy(
polaris_cpp_tmpfs_ifdev_rw(polaris_iosd_t)
)

# iosd reads/writes into grubenv for confreg
optional_policy(
polaris_grub_efi_use(polaris_iosd_t)
)

# when /bootflash or /harddisk are 100% full
allow polaris_iosd_t self:capability sys_resource;

```

```

# mcp_set_clock wants to call settimeofday
allow polaris_iosd_t self:capability sys_time;

# Need this for bluetooth to work. HCI library uses this
allow polaris_iosd_t self:capability net_raw;

ifdef(`mcp_family',`
polaris_obfl_data_read(polaris_iosd_t)
')

# iosd uses quack on mcp and crankshaft and ngwc
ifdef(`mcp_family',`
polaris_quack_dev_use(polaris_iosd_t)
')
ifdef(`crankshaft_family',`
polaris_quack_dev_use(polaris_iosd_t)
')
ifdef(`ngwc_family',`
polaris_quack_dev_use(polaris_iosd_t)
')
ifdef(`qwlc_platform',`
polaris_quack_dev_use(polaris_iosd_t)
')
ifdef(`katar_platform',`
polaris_quack_dev_use(polaris_iosd_t)
')

ifdef(`mcp_family',`
polaris_spa_dev_use(polaris_iosd_t)
polaris_sysfs_platform_dev_use(polaris_iosd_t)
')

# on Ing write/ioctl into /dev/cpld-ha
# on vwlc ha scenario, iosd needs write access to /dev/cpld-ha
optional_policy(`
polaris_cpld_dev_use(polaris_iosd_t)
')

# deals with /dev/shm files semaphors; like uuid_sem semaphore
# created by btrace_get_uuid function
type polaris_iosd_tmpfs_t;
files_tmpfs_file(polaris_iosd_tmpfs_t)
fs_tmpfs_filetrans(polaris_iosd_t, polaris_iosd_tmpfs_t, file)
manage_files_pattern(polaris_iosd_t, tmpfs_t, polaris_iosd_tmpfs_t)

optional_policy(`

```

```

polaris_iodb_tmp_manage(polaris_iods_t)
')

# on ngwc FIPS code reads /tmp/hw_entropy
# seems like iosd can delete the file as well
polaris_hw_entropy_create(polaris_iods_t)

optional_policy(
#on macallan iosd needs to access /dev/cpld
polaris_cpld_dev_read(polaris_iods_t)
')

# on tsn iosd needs write access to
# sys/devices/platform/cpld/reg_rp_reset_button_status
# sys/devices/platform/cpn-110-master DSR/DTR status
#ifdef(^crankshaft_family',`
type polaris_quake_i2c_t;

polaris_cpld_write(polaris_iods_t)
polaris_ggpio_dev_read_write(polaris_iods_t)
polaris_quake_i2c_manage(polaris_iods_t)
')

#ifdef(^katar_platform',`
polaris_cpld_write(polaris_iods_t)
')

# on tsn iosd needs access to /sys/devices/platform/moka_fpga
# /sys/devices/platform/moka_fpga/led_status
optional_policy(
polaris_mokafpga_rw(polaris_iods_t)
')

# iosd reads /tmp/iosd_level
polaris_lm_tmp_read(polaris_iods_t)

# iosd needs manage_dirs, manage_files and manage_lnk
# permissions at "/tmp/ufs/lic0/<remote_ip>/*"
optional_policy(
polaris_ncd_tmp_manage(polaris_iods_t)
')

# access NFS mounted directories from other nodes or members
fs_getattr_nfs(polaris_iods_t)

# mcp/mcprp/if_unix_se.c code works with /sys/devices/virtual/contdev
# files and /proc/net/dev
polaris_manage_contdev_dev(polaris_iods_t)

```

```

kernel_read_network_state(polaris_iosd_t)

# iosd creates /tmp/iox_xml.dat file
optional_policy(`
polaris_iox_manage_tmp_files(polaris_iosd_t)
`)

polaris_caf_var_run_files_manage(polaris_iosd_t)
container_read_lib_files(polaris_iosd_t)

# work with files like /tmp/rp/.shell_exec.5B1BF1D7648E21AEE3000002
type polaris_iosd2iox_tmp_t;
files_tmp_file(polaris_iosd2iox_tmp_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosd2iox_tmp_t, file)
polaris_iosd2iox_tmp_manage(polaris_iosd_t)
# work with response
optional_policy(`
    polaris_iox2iosd_tmp_manage(polaris_iosd_t)
`)

polaris_sandbox_file_dir_list(polaris_iosd_t)

# lfts 2.0 iosd provides route information to kernel. it talks
# using generic netlink family socket. See iosd bsock_sar_netlink_process
# process
allow polaris_iosd_t self:netlink_generic_socket create_socket_perms;
allow polaris_iosd_t self:netlink_socket create_socket_perms;

# LOOK AT ME
# on nyquist iosd accesses files like lic0-2:/sanosync.data.readLock
# from saLockCheck function and it happens just right after lic0-2 was
# mounted over NFSv4. It seems that labels from remote node did not
# take an effect yet. For now allow access to dir and files that
# are not yet labeled.
ifdef(`nyquist_platform',`
files_manage_isid_type_dirs(polaris_iosd_t)
files_manage_isid_type_files(polaris_iosd_t)
`)

ifdef(`ngwc_family',`
polaris_getattr_filesystem_disk_ucode(polaris_iosd_t)
#policy needed for accessing sys/bus/usb/drivers/usb/*/authorized
dev_rw_sysfs(polaris_iosd_t)
`)

ifdef(`passport_platform',`
polaris_cm_rp_tmp_manage(polaris_iosd_t)
`)

```

```

polaris_lfts_dev_use(polaris_iosd_t)

# /dev/shm/vrf_shm access for show command
polaris_vrf_shm_manage(polaris_iosd_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_iosd_t)
`)

# iosd needs access to logging facility
logging_send_syslog_msg(polaris_iosd_t)

#iosd need access to /webui/*.odm files
polaris_read_webui_files(polaris_iosd_t)

# allow getting binos networking stats AF_NETLINK
allow polaris_iosd_t self:netlink_route_socket rw_netlink_socket_perms;

# confd needs to talk with IOSd via real linux udp snmp socket
allow polaris_iosd_t self:udp_socket { create_socket_perms recv_msg send_msg };
corenet_udp_bind_snmp_port(polaris_iosd_t)

# PLEASE LOOK AT code should not use sysv IPC ARIs,
# instead POSIX variants must be used. Remove after
# code changed in proper way
# allow access sysv semaphor created by qfp process
ifdef(`vxe_family',`
polaris_qfp_sem_use(polaris_iosd_t)
`)
ifdef(`wlc_family',`
polaris_qfp_sem_use(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
`)

# lsmapi replacement punt/inject over domain sockets
ifdef(`vxe_family',`
polaris_pi_uds_manage(polaris_iosd_t)
polaris_qfp_dgram_send(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
`)

# CSR when operating in VGA mode uses /dev/tty0 as the console for the system
# (including IOSD).IOSD setup scripts pass in the tty device(s) to use in the
# REAL_CONSOLE and REAL_AUX environment variables. IOSD configures the tty

```

```

# for its operation and hence need the capability.
allow polaris_iosd_t self:capability sys_tty_config;

# LOOK AT ME: hot patch upon a reboot requires execmem operation - which
# currently is not allowed. Remove the following policy when CSCvq59763
# has been completed.
allow polaris_iosd_t self:process execmem;

# /dev/epaN on qwlc/asr1k(mcp)
optional_policy(`
polaris_epa_dev_use(polaris_iosd_t)
`)

# /dev/qae_mem device access on overlord
optional_policy(`
polaris_qae_dev_use(polaris_iosd_t)
`)

# ioucon binary invoked on standby console attach.
polaris_ioucon_dgram_send(polaris_iosd_t)

# usb device requires read permissions.
kernel_read_debugfs(polaris_iosd_t)

# iosd requires access to /tmp/sv
ifdef(`ngwc_family',`
polaris_sv_tmp_use(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
`)

polaris_i2c_use(polaris_iosd_t)

# on CSR AWS deployment iosd needs read access to /dev/console
term_read_console(polaris_iosd_t)

# On vxe platforms the cloudint config is stored in /varied. We need
# to be able to read it.
ifdef(`vxe_family',`
polaris_disk_varied_read(polaris_iosd_t)
`)

# In stacked and ha setup secondary SUP bootflash and hardisk
# are mounted on active and is accessed by iosd.
polaris_getattr_bootflash(polaris_iosd_t)
polaris_getattr_harddisk(polaris_iosd_t)

# read access to /dev/random

```

```

dev_read_rand(polaris_iosd_t)

# Allow access of /tmp/maroon_stats files
polaris_maroon_data_manage_all(polaris_iosd_t)

#access to /dev/bp_async device on nanook platform
optional_policy(`
polaris_bp_async_dev_use(polaris_iosd_t)
`)

#Permission for access file attribute to list the file info
polaris_caf_tmp_files_getattr(polaris_iosd_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_iosd_t)
polaris_tmp_tdlldb_persist_setup(polaris_iosd_t)

# IOSCC needs access to /mnt/firmware for intelligent spa during bootup
polaris_firmware_read(polaris_iosd_t)

# On Sparrow platform: IOSd requires access to /dev/remap_mem0
# and /dev/usb_console for OOB management
# Also allows access to /dev/sparrow_psu and /dev/net/tun
# /dev/shm/sem._dev_i2c_0 sempaphor
#ifdef(`sparrow_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
`)
polaris_remap_mem_dev_use(polaris_iosd_t)
term_use_usb_ttys(polaris_iosd_t)
polaris_sparrow_psu_dev_use(polaris_iosd_t)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

# On Blackheart platform: /dev/shm/sem._dev_i2c_0 sempaphor
# Allow access to /tmp/udev/etc/udev/msata/udev-info and /dev/net/tun
# Allow access to /dev/remap_mem0 for alarm port
#ifdef(`blackheart_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
`)
polaris_udev_access(polaris_iosd_t)
polaris_remap_mem_dev_use(polaris_iosd_t)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)

```

```

corenet_rw_tun_tap_dev(polaris_iosd_t)
mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
')

# handle /tmp/rp/.iosp_client_app token
type polaris_iosp_client_app_token_t;
files_tmp_file(polaris_iosp_client_app_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosp_client_app_token_t, file, ".iosp_client_app")
manage_files_pattern(polaris_iosd_t, polaris_iosp_client_app_token_t, polaris_iosp_client_app_token_t)

# handle /tmp/rp/.iosp_client_dmi token
type polaris_iosp_client_dmi_token_t;
files_tmp_file(polaris_iosp_client_dmi_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosp_client_dmi_token_t, file, ".iosp_client_dmi")
manage_files_pattern(polaris_iosd_t, polaris_iosp_client_dmi_token_t, polaris_iosp_client_dmi_token_t)

# handle /tmp/rp/.iosp_dmiauthd token
type polaris_dmiauthd_token_t;
files_tmp_file(polaris_dmiauthd_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_dmiauthd_token_t, file, ".iosp_dmiauthd")
manage_files_pattern(polaris_iosd_t, polaris_dmiauthd_token_t, polaris_dmiauthd_token_t)

# handle /tmp/rp/.iosp_gnmib token
type polaris_gnmib_token_t;
files_tmp_file(polaris_gnmib_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_gnmib_token_t, file, ".iosp_gnmib")
manage_files_pattern(polaris_iosd_t, polaris_gnmib_token_t, polaris_gnmib_token_t)

polaris_udev_tmp_watch(polaris_iosd_t)

# Interfaces needed for Aventus platform, allow access to
# /dev/shm/sem._dev_i2c_0 sempaphor
# /dev/usb_console for OOB management
# /dev/net/tun
# brctl process needs access to fifo_file
ifdef(^aventus_platform',`
gen_require(`
    type brctl_t;
    type polaris_pman_t;
    type polaris_cm_cc_tmpfs_t;
    type ifconfig_t;
    type polaris_i2c_device_t;
`)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
term_use_usb_ttys(polaris_iosd_t)
allow brctl_t polaris_pman_t:fifo_file append;

```

```

mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
allow ifconfig_t polaris_i2c_device_t:chr_file { read write };
')

# allow access and modify files in /tftp/inv directory
# TODO Need to revisit this for further analysis
ifdef(`mcp_family',`
gen_require(
    type tftpd_dir_rw_t;
)
read_files_pattern(polaris_iosd_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
)

#allow access and modify awips file in /bootflash
gen_require(
type polaris_awips_signature_file_t;
)
filetrans_pattern(polaris_iosd_t, polaris_disk_bootflash_t, polaris_awips_signature_file_t, file, "awips.json")
allow polaris_iosd_t polaris_awips_signature_file_t:file { write create read open getattr unlink};

# handle geodb file access
type polaris_geodb_files_t;
polaris_disk_type(polaris_geodb_files_t)
filetrans_pattern(polaris_iosd_t, polaris_disk_bootflash_t, polaris_geodb_files_t, dir, ".geo")
filetrans_pattern(polaris_iosd_t, polaris_disk_harddisk_t, polaris_geodb_files_t, dir, ".geo")
polaris_geodb_files_manage(polaris_iosd_t)

# handle /var/ip_local_port_range
type polaris_ip_linux_port_var_t;
files_tmp_file(polaris_ip_linux_port_var_t)
files_var_filetrans(polaris_iosd_t, polaris_ip_linux_port_var_t, file, "ip_local_port_range")

# linux_iosd-imag access to file /var/ip_local_port_range
manage_files_pattern(polaris_iosd_t, var_t, polaris_ip_linux_port_var_t)

# Allow access to /bootflash/certs
polaris_wlc_ap_cert_manage(polaris_iosd_t)

# commad "ls" on /var/ip_local_port_range
gen_require(
    type polaris_shell_t;
)
allow polaris_shell_t polaris_ip_linux_port_var_t:file getattr;

# handling /boot/vcpu_template.txt or /csl_p_0/vcpu_template.txt file
# created by iosd by platform resource config command
type polaris_iosd_vcpu_t;
files_type(polaris_iosd_vcpu_t)

```

```

gen_require(
    type polaris_disk_csl_p_t;
    type polaris_disk_varied_t;
)
filetrans_pattern(polaris_iosd_t, { polaris_disk_csl_p_t polaris_disk_varied_t }, polaris_iosd_vcpu_t, file,
"vcpu_template.txt")
manage_files_pattern(polaris_iosd_t, { polaris_disk_csl_p_t polaris_disk_varied_t }, polaris_iosd_vcpu_t)

# allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_iosd_t)
fs_search_cgroup_dirs(polaris_iosd_t)
# for Dynamic Core Allocation IOSd needs write access to cpu sets/shares
ifdef(^crankshaft_family',`
fs_write_cgroup_files(polaris_iosd_t)
)

# sdwan_admintech_generate() creates admintech and admintech_trace files
gen_require(
    type polaris_admin_tech_data_t;
)
polaris_bootflash_filetrans(polaris_iosd_t, polaris_admin_tech_data_t, file, "admintech")
polaris_bootflash_filetrans(polaris_iosd_t, polaris_admin_tech_data_t, file, "admintech_trace")
filetrans_pattern(polaris_iosd_t, polaris_chasfs_t, polaris_admin_tech_data_t, file, "ios_admintech_done")
filetrans_pattern(polaris_iosd_t, polaris_chasfs_t, polaris_admin_tech_data_t, file, "ios_admintech_request")
polaris_admin_tech_data_manage(polaris_iosd_t)
# with "/bootflash"...this needs attr to access for logfile
polaris_user_file_getattr(polaris_iosd_t)
allow polaris_iosd_t polaris_user_file_t:file { open unlink };
#=====
# petra platform
ifdef(^petra_platform',`
# iosd need access to petra fpga
polaris_iots_fpga_dev_use(polaris_iosd_t)
# iosd need access to memory devices
polaris_iots_tm_dev_use(polaris_iosd_t)
#allow map permission for /dev/shm/TM_A53_APIS
allow polaris_iosd_t polaris_iosd_tmpfs_t:file map;
#allow access to polaris_cm_rp_t sem
polaris_cm_rp_sem_use(polaris_iosd_t)
#allow access to userio
dev_rw_userio_dev(polaris_iosd_t)
allow polaris_iosd_t userio_device_t:chr_file { map };
#iosd need access to sysfs
dev_rw_sysfs(polaris_iosd_t)
allow polaris_iosd_t sysfs_t:file { create map };
dev_manage_sysfs_dirs(polaris_iosd_t)
# iosd need access to sdflash files image is stored
polaris_swipedrive_file_manage(polaris_iosd_t)

```

```

polaris_getattr_swipedrive(polaris_iosd_t)
#iosd need access to mmcblk0p3
gen_require(
    type polaris_disk_recovery_t;
)
allow polaris_iosd_t polaris_disk_recovery_t:filesystem getattr;
#iosd need access to mmcblk0p2
polaris_getattr_filesystem_disk_ucode(polaris_iosd_t)
# iosd need access to /dev/mvDmaDrv
polaris_mvDmaDrv_dev_use(polaris_iosd_t)
# iosd need access to /dev/mvIntDrv
polaris_mvIntDrv_dev_use(polaris_iosd_t)
#iosd need permission for LED
polaris_led_dev_use(polaris_iosd_t)
#iosd need access to rawip socket by initscripts/rc.d/init.d/iptables
allow polaris_iosd_t self:rawip_socket create_socket_perms;
#iosd needs access to /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_iosd_t)
#iosd need permission to /dev/rtc0 done via imsp_update_sw_hwclock()
dev_rw_realtime_clock(polaris_iosd_t)
)
# work with /tmp/usb-disable: create/write
type polaris_iosd_usb_disable_tmp_t;
files_tmp_file(polaris_iosd_usb_disable_tmp_t);
polaris_iosd_usb_disable_tmp_manage(polaris_iosd_t)

ifdef(`ngwc_family',`
# SELINUX Mismatch warning when doing power redundancy configuration commands
# Allow access /bootflash/nplusrm-power
polaris_nplusrm_power_manage(polaris_iosd_t)
)

optional_policy(
    polaris_efi_files_list_dirs(polaris_iosd_t)
)

# work with /dev/shm/mq.-iosd_to_timingd
type polaris_iosd_timing_mqipc_t;
polaris_mqipc_type(polaris_iosd_timing_mqipc_t)

polaris_mqipc_create_name(polaris_iosd_t, polaris_iosd_timing_mqipc_t, iosd_to_timingd)

# watch /tmp
allow polaris_iosd_t tmp_t:dir watch;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiosd.te

```

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```
#
# January 2018, Manohar Hungund
#
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#

## <summary>Polaris oct_dp_log_rp Policy Rules.</summary>
```

Found in path(s):  
\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.if  
No license file was found, but licenses were detected in source scan.

```
#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris cedge Policy Rules.</summary>
```

```
#####
## <summary>
##   Manage /tmp/xml files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_xml_tmp_manage`,`
    gen_require(`
        type polaris_cedge_xml_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_cedge_xml_tmp_t, polaris_cedge_xml_tmp_t)
    manage_files_pattern($1, polaris_cedge_xml_tmp_t, polaris_cedge_xml_tmp_t)
    files_tmp_filetrans($1, polaris_cedge_xml_tmp_t, dir, "xml")

    allow $1 polaris_cedge_xml_tmp_t:dir { watch mounon };
    allow $1 polaris_cedge_xml_tmp_t:file map;
`)

#####
## <summary>
```

```

## Manage /tmp/tmp files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cedge_tmp_manage`,`
    gen_require(`
        type polaris_cedge_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_cedge_tmp_t, polaris_cedge_tmp_t)
    manage_files_pattern($1, polaris_cedge_tmp_t, polaris_cedge_tmp_t)
    files_tmp_filetrans($1, polaris_cedge_tmp_t, dir, "tmp")
)

#####
## <summary>
## Manage /etc/viptela files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cedge_etc_manage`,`
    gen_require(`
        type polaris_cedge_etc_t;
    `)
    manage_dirs_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    manage_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    manage_lnk_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    files_etc_filetrans($1, polaris_cedge_etc_t, dir, "viptela")
)

#####
## <summary>
## Read /etc/viptela files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_cedge_etc_read`,`
    gen_require(`
        type polaris_cedge_etc_t;
    `)
    search_dirs_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    read_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    read_lnk_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    files_etc_filetrans($1, polaris_cedge_etc_t, dir, "viptela")
)

```

```
#####
```

```

## <summary>
##   Watch cedge_etc directories and files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_cedge_etc_watch`,`
    gen_require(`
        type polaris_cedge_etc_t;
    `)
    allow $1 polaris_cedge_etc_t: { dir file } watch;
)

```

```
#####
```

```

## <summary>
##   Read access /var/run/netns/* performed from vip_util_set_ns
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cedge_set_ns`,`
    init_read_state($1)
    fs_read_nsfs_files($1)
    sysnet_manage_ifconfig_run($1)
)

```

```
#####
```

```

## <summary>
##   Read access /proc/1/ns/net performed from vip_util_reset_ns
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_reset_ns`,`
    init_read_state($1)
`)

#####
## <summary>
##   Manage /dev/shm viptela files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_tmpfs_manage`,`
    gen_require(`
        type polaris_cedge_tmpfs_t;
        type tmpfs_t;
    `)
    fs_tmpfs_filetrans($1, polaris_cedge_tmpfs_t, file)
    manage_files_pattern($1, tmpfs_t, polaris_cedge_tmpfs_t)
    allow $1 polaris_cedge_tmpfs_t:file map;
`)

#####
## <summary>
##   Manage /tmp/.econfd2sysmgr-ipc files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_econfd2sysmgr_tmp_manage`,`
    gen_require(`
        type polaris_econfd2sysmgr_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_econfd2sysmgr_tmp_t, polaris_econfd2sysmgr_tmp_t)
    manage_files_pattern($1, polaris_econfd2sysmgr_tmp_t, polaris_econfd2sysmgr_tmp_t)
    files_tmp_filetrans($1, polaris_econfd2sysmgr_tmp_t, dir, ".econfd2sysmgr-ipc")
    allow $1 polaris_econfd2sysmgr_tmp_t:dir watch;
`)

```

)

#####

## <summary>

## Manage /tmp/\* labeled with polaris\_vconfd\_cert\_tmp\_t

## for vconfd\_script\_upload\_root\_ca\_cert\_chain.sh to access

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_vconfd\_cert\_tmp\_manage`,`

gen\_require(`

type polaris\_vconfd\_cert\_tmp\_t;

`)

manage\_dirs\_pattern(\$1, polaris\_vconfd\_cert\_tmp\_t, polaris\_vconfd\_cert\_tmp\_t)

manage\_files\_pattern(\$1, polaris\_vconfd\_cert\_tmp\_t, polaris\_vconfd\_cert\_tmp\_t)

`)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedge.if

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris cpp\_driver Policy Rules.</summary>

#####

## <summary>

## Allow access to semaphore with type polaris\_cpp\_driver\_t

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_cpp\_driver\_sem\_use`,`

gen\_require(`

type polaris\_cpp\_driver\_t;

`)

```

    allow $1 polaris_cpp_driver_t:sem rw_sem_perms;
)

#####
## <summary>
##   Allow access to shared memory with type polaris_cpp_driver_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_driver_shm_use`,
    gen_require(`
        type polaris_cpp_driver_t;
    `)
    allow $1 polaris_cpp_driver_t:shm rw_shm_perms;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppdriver.if

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```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarisautoupgrade Policy Rules.</summary>

#####
## <summary>
##   Execute auto-upgrade scripts in their own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_autoupgrade_domtrans`,
    gen_require(`
        type polaris_autoupgrade_t;
        type polaris_autoupgrade_exec_t;
    `)

```

```

    ')

    domtrans_pattern($1, polaris_autoupgrade_exec_t, polaris_autoupgrade_t)
')

#####
## <summary>
##   Manage tmp files created by autoupgrade.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_autoupgrade_tmp_manage`,`
    gen_require(`
        type polaris_autoupgrade_tmp_t;
    `)

    manage_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
    manage_lnk_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
    manage_fifo_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.if

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```

#
# October 2019, Patrick O'Halloran
#
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#

## <summary>Polaris CRFT Policy Rules.</summary>

#####
# CRFT policy
#####

#####
## <summary>
##   Allow read-only access to CRFT generated files
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="file_type">
## <summary>
## File type of crft that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_read`,`
    gen_require(`
        type polaris_crft_data_t;
        type polaris_crft_request_t;
        type polaris_crft_request_crft_t;
    `)

    read_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    polaris_disk_bootflash_read_lnk($1)
    polaris_disk_harddisk_read_lnk($1)
    read_files_pattern($1, polaris_crft_request_crft_t, polaris_crft_request_crft_t)
    allow $1 polaris_crft_request_t:fifo_file { ioctl write };
)

#####
## <summary>
## Manage crft persistent files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_manage`,`
    gen_require(`
        type polaris_crft_data_t;
    `)

    manage_dirs_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    manage_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    manage_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    # Note: Based on dicussion with SELinux team, we need to call this
    # out specifically here for lnk file access, as:
    # - NGWC /harddisk -(symlink)-> /misc/scratch -(symlink)-> /mnt/sda3/user
    polaris_disk_bootflash_read_lnk($1)

```

```

    polaris_disk_harddisk_read_lnk($1)
    allow $1 polaris_crft_data_t:file map;
)

#####
## <summary>
##   Manage crft files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_manage_all`,`
    polaris_crft_data_manage($1)

    gen_require(`
        attribute polaris_crft_data_domain;
        type polaris_crft_data_t;
    `)

    manage_files_pattern($1, polaris_crft_data_t, polaris_crft_data_domain)
    manage_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_domain)
    allow $1 polaris_crft_data_domain:file map;
)

#####
## <summary>
## Make the specified type usable as crft data file type.
## </summary>
## <param name="type">
##   <summary>
##     Type to be used for files.
##   </summary>
## </param>
#
interface(`polaris_crft_data_type`,`
    files_type($1)
    polaris_pfile_type($1)
    gen_require(`
        attribute polaris_crft_data_domain;
    `)
    typeattribute $1 polaris_crft_data_domain;
)

#####

```

```

## <summary>
##   Process to manage its own crft files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="file_type">
##   <summary>
##     File type of crft that corresponds to given domain.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_client`,`
  gen_require(`
    type polaris_crft_data_t;
  `)

  manage_dirs_pattern($1, polaris_crft_data_t, $2)
  manage_files_pattern($1, polaris_crft_data_t, $2)
  manage_lnk_files_pattern($1, polaris_crft_data_t, $2)
  filetrans_pattern($1, polaris_crft_data_t, $2, file)
  allow $1 $2:file map;
`)

#####
## <summary>
##   Process to manage its own crft files
## </summary>
## <param name="domain_stem">
##   <summary>
##     Steam of domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_client_template`,`
  gen_require(`
    attribute polaris_crft_data_domain;
    type polaris_crft_data_t;
  `)

  type polaris_$1_crft_t;
  polaris_crft_data_type(polaris_$1_crft_t)
  polaris_crft_data_client(polaris_$1_t, polaris_$1_crft_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrft.if

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#

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#

/usr/cpp/bin/cpp\_ha\_top\_level\_server -- gen\_context(system\_u:object\_r:polaris\_cpp\_ha\_exec\_t,s0)

/usr/cpp/bin/cpp\_ha\_top\_level\_server\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_ha\_exec\_t,s0)

/usr/cpp/bin/cpp\_ha\_top\_level\_server\_us\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_ha\_exec\_t,s0)

/usr/cpp/bin/cpp\_ha\_top\_level\_server\_vwlc -- gen\_context(system\_u:object\_r:polaris\_cpp\_ha\_exec\_t,s0)

/usr/cpp/bin/cpp\_ha\_top\_level\_server\_vwlc\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_ha\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppha.fc

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#

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#

policy\_module(polariscfg, 1.0);

#####

# Cfg files policy

#####

type polaris\_cfg\_data\_t;

files\_type(polaris\_cfg\_data\_t)

gen\_require(^

    attribute polaris\_extended\_domain;

')

files\_tmp\_filetrans(polaris\_extended\_domain, polaris\_cfg\_data\_t, dir, "cfg")

#####

# cfg\_sync.sh policy

#####

polaris\_utility\_domain\_template(cfg\_sync)

polaris\_bexecute\_domain(polaris\_cfg\_sync\_t, polaris\_cfg\_sync\_exec\_t)

polaris\_boot\_tmp\_read(polaris\_cfg\_sync\_t)  
polaris\_btrace\_data\_manage(polaris\_cfg\_sync\_t)  
polaris\_chasfs\_read(polaris\_cfg\_sync\_t)  
polaris\_cpld\_read(polaris\_cfg\_sync\_t)  
polaris\_use\_btrace\_fifo(polaris\_cfg\_sync\_t)

corecmd\_exec\_bin(polaris\_cfg\_sync\_t)  
auth\_use\_nsswitch(polaris\_cfg\_sync\_t)

polaris\_bootflash\_read(polaris\_cfg\_sync\_t)  
polaris\_nvram\_manage(polaris\_cfg\_sync\_t)  
telnet\_use\_ptys(polaris\_cfg\_sync\_t)

```
gen_require(  
    type rsync_t;  
)  
rsync_entry_domtrans(polaris_cfg_sync_t, rsync_t)  
allow rsync_t polaris_cfg_sync_t:process sigchld;  
# file descriptor leak when rsync is called  
allow rsync_t polaris_cfg_sync_t:fifo_file { write getattr };
```

logging\_send\_syslog\_msg(polaris\_cfg\_sync\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfg.te

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

# polarisvxeipbaseauto file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_base\_fc.m4

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#

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#

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```

#

## <summary>Polaris cm_fp Policy Rules.</summary>

#####
## <summary>
## Execute cmand_fp in the polaris_cm_fp_t domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cm_fp_domtrans`,`
gen_require(`
type polaris_cm_fp_t, polaris_cm_fp_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_cm_fp_exec_t, polaris_cm_fp_t)
`)

#####
## <summary>
## Allow the specified domain to manage cm_fp_tmp files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_tmp_manage`,`
gen_require(`
type polaris_cm_fp_tmp_t;
type tmp_t;
`)

manage_files_pattern($1, { polaris_cm_fp_tmp_t tmp_t }, polaris_cm_fp_tmp_t)
`)

#####
## <summary>
## Create objects in /tmp with a polaris_cm_fp_tmp_t
## type using a type_transition.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_tmp_filetrans`,`
gen_require(`
type polaris_cm_fp_tmp_t;
`)
files_tmp_filetrans($1, polaris_cm_fp_tmp_t, file, "octeon-remote-lock-pci:0")
`)

```

```

#####
## <summary>
## Allow access to semaphore with type polaris_cm_fp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_sem_use`,`
gen_require(`
type polaris_cm_fp_t;
`)
allow $1 polaris_cm_fp_t:sem rw_sem_perms;
`)

```

```

#####
## <summary>
## Allow access to shared memory with type polaris_cm_fp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_shm_use`,`
gen_require(`
type polaris_cm_fp_t;
`)
allow $1 polaris_cm_fp_t:shm rw_shm_perms;
`)

```

```

#####
## <summary>

```

```

## Allow access to /dev/hkp with type polaris_cm_fp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hkp_dev_use',`
    gen_require(`
        type device_t;
        type polaris_hkp_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_hkp_device_t)
    read_chr_files_pattern($1, device_t, polaris_hkp_device_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmfp.if

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```

#
# August 2017, Shawn Lu
#
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#

```

# polarisifmgr file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.fc

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```

#
# August 2017, Victor Kamensky
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#

```

## <summary>Polaris crankshaft Platform Policy Rules.</summary>

#####

```

## <summary>
## Work (read, write, ioctl) with /dev/linux-(user|kernel)-bde devices
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bde_dev_use`,`
gen_require(`
    type device_t;
    type polaris_bde_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_bde_device_t)
    read_chr_files_pattern($1, device_t, polaris_bde_device_t)
    allow $1 polaris_bde_device_t:chr_file map;
)

```

```

#####
## <summary>
## Work (read, write, ioctl) with /dev/dash_fpga device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dash_dev_use`,`
gen_require(`
    type device_t;
    type polaris_dash_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_dash_device_t)
    read_chr_files_pattern($1, device_t, polaris_dash_device_t)
    allow $1 polaris_dash_device_t:chr_file map;
)

```

```

#####
## <summary>
## Work (read, write, ioctl) with /dev/huron_fpga device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_huron_dev_use`,`
gen_require(`
    type device_t;

```

```

        type polaris_huron_device_t;
    ')
    write_chr_files_pattern($1, device_t, polaris_huron_device_t)
    read_chr_files_pattern($1, device_t, polaris_huron_device_t)
    allow $1 polaris_huron_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dplr_sumatra
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sumatra_doppler_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_sumatra_doppler_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_sumatra_doppler_device_t)
    read_chr_files_pattern($1, device_t, polaris_sumatra_doppler_device_t)
    allow $1 polaris_sumatra_doppler_device_t:chr_file map;
)

#####
## <summary>
##   Work (open, read, write, ioctl) with /dev/sirius_fpga device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sirius_fpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_siriusfpga_device_t;
    `)
    rw_chr_files_pattern($1, device_t, polaris_siriusfpga_device_t);
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/nios device

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_nios_dev_use`,`
gen_require(`
    type device_t;
    type polaris_nios_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_nios_device_t)
    read_chr_files_pattern($1, device_t, polaris_nios_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/qaemem device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_qae_dev_use`,`
gen_require(`
    type device_t;
    type polaris_qae_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_qae_device_t)
    read_chr_files_pattern($1, device_t, polaris_qae_device_t)
`)

#####
## <summary>
##   Read mokafpga files in /sys/devices/platform directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_mokafpga_read`,`
gen_require(`
    type polaris_sysfs_mokafpga_t;

```

```

        type sysfs_t;
    ')
    read_files_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
    list_dirs_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
)

```

```
#####
```

```

## <summary>
##   Read/Write mokafpga files in /sys/devices/platform directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_mokafpga_rw`,`
    gen_require(`
        type polaris_sysfs_mokafpga_t;
        type sysfs_t;
    `)
    rw_files_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
    list_dirs_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
)

```

```
#####
```

```

## <summary>
##   Work (read, write, ioctl) with /dev/moka_fpga
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_mokafpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_mokafpga_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_mokafpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_mokafpga_device_t)
)

```

```
#####
```

```

## <summary>
##   Work (read, write, ioctl) with /dev/nim_dm_0_1 and
## /dev/nim_dm devices

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_nim_dm_dev_use`,`
gen_require(`
    type device_t;
    type polaris_nim_dm_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_nim_dm_device_t)
    read_chr_files_pattern($1, device_t, polaris_nim_dm_device_t)
    allow $1 polaris_nim_dm_device_t:chr_file map;
    allow $1 device_t:chr_file map;
)

#####
## <summary>
##   Execute a domain transition to run load_usbnet.sh.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_load_usbnet_domtrans`,`
gen_require(`
    type polaris_load_usbnet_t, polaris_load_usbnet_exec_t;
`)

    domtrans_pattern($1, polaris_load_usbnet_exec_t, polaris_load_usbnet_t)
)

#####
## <summary>
##   Label and allow access to i2c semaphore files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i2c_sem_manage`,`

```

```

gen_require(
    type tmpfs_t;
    type polaris_cm_cc_tmpfs_t;
)
manage_files_pattern($1, tmpfs_t, polaris_cm_cc_tmpfs_t)
mmap_files_pattern($1, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/bp_async device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_bp_async_dev_use`,
    gen_require(
        type device_t;
        type polaris_bp_async_device_t;
    )
    write_chr_files_pattern($1, device_t, polaris_bp_async_device_t)
    read_chr_files_pattern($1, device_t, polaris_bp_async_device_t)
    allow $1 polaris_bp_async_device_t:chr_file map;
)

```

```
#####
```

```

## <summary>
## Label and allow access to i2c semaphore files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_udev_access`,
    gen_require(
        type tmpfs_t;
        type polaris_udev_tmp_files_t;
    )
    manage_files_pattern($1, tmpfs_t, polaris_udev_tmp_files_t)
)

```

```

## <summary>
## Work (read, write, ioctl) with /dev/sparrow_psu device

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sparrow_psu_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_sparrow_psu_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_sparrow_psu_device_t)
    read_chr_files_pattern($1, device_t, polaris_sparrow_psu_device_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/nutella_fpga device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_nutella_fpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_nutella_fpga_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_nutella_fpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_nutella_fpga_device_t)
`)

#####
## <summary>
## Read and write to qcqmi devices.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_qcqmi_dev_use`,`
    gen_require(`
        type device_t, qcqmi_device_t;

```

```

)

rw_chr_files_pattern($1, device_t, qcqmi_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/sm_nim_adpt device files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sm_nim_adpt_dev_use`,`
gen_require(`
    type device_t;
    type polaris_sm_nim_adpt_device_t;
)

write_chr_files_pattern($1, device_t, polaris_sm_nim_adpt_device_t)
read_chr_files_pattern($1, device_t, polaris_sm_nim_adpt_device_t)
allow $1 polaris_sm_nim_adpt_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dio-*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dio_dev_use`,`
gen_require(`
    type device_t;
    type polaris_dio_device_t;
)
write_chr_files_pattern($1, device_t, polaris_dio_device_t)
read_chr_files_pattern($1, device_t, polaris_dio_device_t)
allow $1 polaris_dio_device_t:chr_file map;
)

#####
## <summary>

```

```

## Read /dev/dio-*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dio_dev_read`,`
    gen_require(`
        type device_t;
        type polaris_dio_device_t;
    `)
    read_chr_files_pattern($1, device_t, polaris_dio_device_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/ttyNMEA* and /dev/ttyTunNMEA*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tty_NMEA_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_tty_NMEA_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
    read_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
    allow $1 polaris_tty_NMEA_device_t:chr_file map;
`)

#####
## <summary>
## Read /dev/ttyNMEA* and /dev/ttyTunNMEA*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tty_NMEA_dev_read`,`
    gen_require(`

```

```
        type device_t;
        type polaris_tty_NMEA_device_t;
    )
    read_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
)
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/nim_phy
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_nim_phy_dev_use`,
gen_require(
    type device_t;
    type polaris_nim_phy_device_t;
)
    rw_chr_files_pattern($1, device_t, polaris_nim_phy_device_t)
    allow $1 polaris_nim_phy_device_t:chr_file map;
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.if

No license file was found, but licenses were detected in source scan.

dnl

dnl July 2020, Victor Kamensky

dnl

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dnl

dnl c8kv Platform Max Bay Limits

max\_bay\_map\_set(`rp`, `per\_bay`, 0)

max\_bay\_map\_set(`cc`, `per\_bay`, 3)

max\_bay\_map\_set(`fp`, `per\_bay`, 0)

max\_bay\_ripc\_map\_set(`rp`, `per\_bay`, 0)

max\_bay\_ripc\_map\_set(`cc`, `per\_bay`, 3)

max\_bay\_ripc\_map\_set(`fp`, `per\_bay`, 0)

max\_bay\_ripc\_map\_set(`rp`, `global`, 0)

max\_bay\_ripc\_map\_set(`cc`, `global`, 3)

max\_bay\_ripc\_map\_set(`fp`, `global`, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/c8kvmmaps.m4

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Victor Kamensky
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#

# /bootflash labels
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?    gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/.ssh/ssh_host.*_key      gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/tracelogs(/.*)?         gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/tan(/.*)?              gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/core(/.*)?            gen_context(system_u:object_r:polaris_core_file_t,s0)
/bootflash/debug.conf            gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/bootflash/packages.conf         gen_context(system_u:object_r:polaris_packages_conf_t,s0)

# /objstore/.swtam for hybrid TAM access
/objstore(/.*)?                gen_context(system_u:object_r:polaris_disk_objstore_t,s0)

/csl_p_0(/.*)?                 gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_p_1(/.*)?                 gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_s_0(/.*)?                 gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/csl_s_1(/.*)?                 gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/obfl(/.*)?                     gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# not really a license file stored by iosd during platform resource config command
/csl_p_0/vcpu_template.txt      gen_context(system_u:object_r:polaris_iosd_vcpu_t,s0)

# nvram devices
/dev/bootflash2 -b             gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/bootflash3 -b             gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/sda2 -b                    gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/sda3 -b                    gen_context(system_u:object_r:polaris_nvram_file_t,s0)

/dev/linux-user-bde -c gen_context(system_u:object_r:polaris_bde_device_t,s0)
/dev/linux-kernel-bde -c gen_context(system_u:object_r:polaris_bde_device_t,s0)

/dev/dash_fpga -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc0 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc1 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc2 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc3 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
```

```

/dev/dash_fpga_nios -c gen_context(system_u:object_r:polaris_dash_device_t,s0)

/dev/huron_fpga -c gen_context(system_u:object_r:polaris_huron_device_t,s0)
/dev/dplr_sumatra -c gen_context(system_u:object_r:polaris_sumatra_doppler_device_t,s0)

/dev/nios -c gen_context(system_u:object_r:polaris_nios_device_t,s0)

/dev/qaе_mem -c gen_context(system_u:object_r:polaris_qae_device_t,s0)

/dev/icp_adf_gige_wd -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_csr -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_ring -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem_page -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

# moka fpga
/dev/moka_fpga -c gen_context(system_u:object_r:polaris_mokafpga_device_t,s0)
/dev/moka_fpga_cc -c gen_context(system_u:object_r:polaris_mokafpga_device_t,s0)

# for load usbnet module
/usr/binos/conf/load_usbnet.sh -- gen_context(system_u:object_r:polaris_load_usbnet_exec_t,s0)

/dev/nim_dm -c gen_context(system_u:object_r:polaris_nim_dm_device_t,s0)
/dev/nim_dm_0_1 -c gen_context(system_u:object_r:polaris_nim_dm_device_t,s0)

/dev/nim_phy -c gen_context(system_u:object_r:polaris_nim_phy_device_t,s0)

# file-system on blackheart/sparrow
# /crashinfo is symbolic link to /flash1
/crashinfo          gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)

# /flash is symbolic link to /flash1
/flash              gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /flash0 NVRAM
/flash0(/.*)?      gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# /flash1 Bootflash
/flash1(/.*)?      gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/flash1/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/.geo(/.*)?      gen_context(system_u:object_r:polaris_geodb_files_t,s0)
/flash1/.USWAP(/.*)?      gen_context(system_u:object_r:polaris_uswap_files_t,s0)
/flash1/.dbpersist(/.*)?      gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/flash1/debug.conf --      gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/flash1/packages.conf      gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/flash1/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/.rollback_timer(/.*)?      gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/flash1/.installer(/.*)?      gen_context(system_u:object_r:polaris_disk_install_t,s0)

```

```

/flash1/.ssh(/.*)?          gen_context(system_u:object_r:ssh_home_t,s0)
/flash1/.ssh/ssh_host.*_key\,pub  gen_context(system_u:object_r:sshd_key_t,s0)
/flash1/.ssh/ssh_host.*_key      gen_context(system_u:object_r:sshd_key_t,s0)

# /flash3 OBFL
/flash3(/.*)?                gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/flash3/OBFL(/.*)?          gen_context(system_u:object_r:polaris_obfl_data_t,s0)

#harddisk
/vol/harddisk(/.*)?          gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/mnt/msata(/.*)?            gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

# for usage by IOx
/vol/usb1(/.*)?              gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

/dev/shm/sem\._dev_i2c_0      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
/dev/shm/sem\._dev_i2c_1      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
/dev/shm/sem\._dev_i2c_2      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)

/tmp/udev/etc/udev/msata/udev-info  gen_context(system_u:object_r:polaris_udev_tmp_files_t,s0)

# Nvram symlink on Aventus platform
/aventus_config/nvram        gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# Nvram symlink on Cabo platform
/cabo_config/nvram           gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# Device applicable to Betelgeuse platform
/dev/sirius_fpga             gen_context(system_u:object_r:polaris_siriusfpga_device_t,s0)

# Device applicable to Nanook platform
/dev/bp_async -c gen_context(system_u:object_r:polaris_bp_async_device_t,s0)

# Device applicable to Sparrow platform
/dev/remap_mem0 -c gen_context(system_u:object_r:polaris_remap_mem_device_t,s0)
/dev/sparrow_psu -c gen_context(system_u:object_r:polaris_sparrow_psu_device_t,s0)
/dev/dio-upstream -c gen_context(system_u:object_r:polaris_dio_device_t,s0)
/dev/dio-[1-4] -c gen_context(system_u:object_r:polaris_dio_device_t,s0)
/dev/ttyNMEA[0-1] -c gen_context(system_u:object_r:polaris_tty_NMEA_device_t,s0)
/dev/ttyTunNMEA[0-1] -c gen_context(system_u:object_r:polaris_tty_NMEA_device_t,s0)

# Device applicable to Nutella platform
/dev/nutella_fpga -c gen_context(system_u:object_r:polaris_nutella_fpga_device_t,s0)

#Only qcqmi0 and qcqmi1 are generated for Telit/SWI modems
/dev/qcqmi0 -c gen_context(system_u:object_r:qcqmi_device_t,s0)
/dev/qcqmi1 -c gen_context(system_u:object_r:qcqmi_device_t,s0)

```

```

#SM NIM Adpater Switzer-CC device files
/dev/sm_nim_adpt_fpga_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_1_0 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_1_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_fpga_2 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_2_0 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_2_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)

# CLI: show platform hardware msata
/usr/binos/bin/msata_info.sh -- gen_context(system_u:object_r:polaris_msata_info_exec_t,s0)
/tmp/sata_status -- gen_context(system_u:object_r:polaris_sata_status_tmp_t,s0)

# Memory blocks and gpp for Nutella platform
/dev/mmcblk0gp0p1 gen_context(system_u:object_r:polaris_nutella_gp0_t,s0)
/gpp gen_context(system_u:object_r:polaris_nutella_gpp_t,s0)

# CLI: show platform hardware slot p[x] fan eeprom
/usr/binos/conf/mcp_fan_eeprom_cmd.sh -- gen_context(system_u:object_r:polaris_smart_fan_exec_t,s0)

/var/run/cwan_ezmanage_cwan_server -- gen_context(system_u:object_r:polaris_cwan_svr_var_run_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.fc

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```

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#

```

```
policy_module(polariscmfp, 1.0);
```

```
gen_require(
    type polaris_cm_fp_t;
)
```

```

polaris_btrace_data_manage(polaris_cm_fp_t)
polaris_crft_data_manage(polaris_cm_fp_t)
polaris_chasfs_manage(polaris_cm_fp_t)
polaris_tdlresolve_read(polaris_cm_fp_t)
polaris_tdlldb_list_dirs(polaris_cm_fp_t)
polaris_cpld_read(polaris_cm_fp_t)
polaris_flashlib_read(polaris_cm_fp_t)

```

```
polaris_ripc_sman_ui_serv_connect(polaris_cm_fp_t)
```

```

polaris_cpld_dev_use(polaris_cm_fp_t)
polaris_proc_rmonbifo_read(polaris_cm_fp_t)
polaris_obfl_data_read(polaris_cm_fp_t)
polaris_persistent_list_dirs(polaris_cm_fp_t)
polaris_chasync_files_manage(polaris_cm_fp_t)

# cman_fp creates /tmp/cpp_anon_db file, instead of adding it to polaris_cpp_domain
# let us just grant access to cpp tmp files
polaris_cpp_tmp_files_use(polaris_cm_fp_t, "cpp_anon_db")
# on 1ng works with /dev/cpp
polaris_cpp_dev_use(polaris_cm_fp_t)

# work with /dev/i2c devices
polaris_i2c_use(polaris_cm_fp_t)

# on ultra read eeprom through i2c
# type=AVC msg=audit(1479556298.842:11): avc: denied { getattr } for pid=5464 comm="cman_fp"
path="/sys/devices/i2c-0/i2c-1/1-0056/eeprom" dev="sysfs" ino=25556
scontext=system_u:system_r:polaris_cm_fp_t:s0 tcontext=system_u:object_r:sysfs_t:s0 tclass=file
# type=AVC msg=audit(1479556298.842:12): avc: denied { read write } for pid=5464 comm="cman_fp"
name="eeprom" dev="sysfs" ino=25556 scountext=system_u:system_r:polaris_cm_fp_t:s0
tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_rw_sysfs(polaris_cm_fp_t)

polaris_icc_broken_relocations(polaris_cm_fp_t)

allow polaris_cm_fp_t self:udp_socket { create ioctl };

# cman_fp can start dyncfg_setup.sh, allow its transition to dyncfg_t type
polaris_dyncfg_domtrans(polaris_cm_fp_t)

# on 1ng cman_fp write into /bootflash/crypto/octeon_pci_console_dev0_20170723_075412.log
polaris_bootflash_manage(polaris_cm_fp_t)

polaris_disk_harddisk_read_lnk(polaris_cm_fp_t)

# write to devices like this /proc/bus/pci/04/00.0
kernel_read_system_state(polaris_cm_fp_t)
kernel_write_proc_files(polaris_cm_fp_t)

# cm_fp tmp files like /tmp/octeon-remote-lock-pci:0
type polaris_cm_fp_tmp_t;
files_tmp_file(polaris_cm_fp_tmp_t)
polaris_cm_fp_tmp_filetrans(polaris_cm_fp_t)
polaris_cm_fp_tmp_manage(polaris_cm_fp_t)
# besides /tmp/octeon-remote-lock-pci:0 all other files in /tmp
# are ours

```

```

files_tmp_filetrans(polaris_cm_fp_t, polaris_cm_fp_tmp_t, file)

# LOOK AT ME: raw memory write access
#ifdef(^mcp_family',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh55517)
#ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# LOOK AT ME: raw memory access in dopler SDK remove after
# CSCvm34516 is fixed using CSCvm34630
#ifdef(^starfleet_platform',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# "show platform hardware slot F0 eobc interface standby rmon" leads to
# ioctl() call from cmlib_get_eobc_drv_info().
kernel_request_load_module(polaris_cm_fp_t)

# needed for "show platform hardware slot F0 eobc interface standby rmon"
kernel_read_network_state(polaris_cm_fp_t)

# on RP2/RP3 linecard cyan init happens within cm
#ifdef(^mcp_family',`
polaris_dyncfg_setup(polaris_cm_fp_t)
`)

allow polaris_cm_fp_t self:capability dac_override;

polaris_obfl_data_manage(polaris_cm_fp_t)

allow polaris_cm_fp_t self:netlink_route_socket rw_netlink_socket_perms;

#ifdef(^ngwc_family',`
# cmfp_asic_mmap_func() function in cmfp module uses
# /dev/chdrvmmmap for asic memory mapping
polaris_chdrvmmmap_dev_use(polaris_cm_fp_t)

# on macallan cman_fp needs access to /dev/cisco/dplriomem
# for mappin dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_cm_fp_t);

# on macallan iomd needs access to /dev/cisco/fpgaiomem
# for mapping FPGA io memory to application space.

```

```
polaris_fpga_iomem_mmapfpga_dev_use(polaris_cm_fp_t);
')

optional_policy(`
# Allow /dev/dmabmap access
polaris_dmabmap_dev_use(polaris_cm_fp_t)
')

# on starfleet need access to
# /sys/device/platform/cpld/reg_fan_control
polaris_cpld_write(polaris_cm_fp_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_cm_fp_t)
')

logging_send_syslog_msg(polaris_cm_fp_t)

# /dev/epactrlN on qwlc
optional_policy(`
polaris_epa_dev_use(polaris_cm_fp_t)
')

# /dev/astro on qwlc
optional_policy(`
polaris_astro_dev_use(polaris_cm_fp_t)
')

# /dev/cpp_il on qwlc
optional_policy(`
polaris_cpp_il_dev_use(polaris_cm_fp_t)
')

# on radium need to get model info
optional_policy(`
polaris_dash_dev_use(polaris_cm_fp_t)
')

# on neptune, cavium library in o2_cavm_mem_map wants access to
# /sys/devices/pci0000:00/0000:00:01.0/0000:01:00.0/resource0
optional_policy(`
polaris_cpp_cavium_dma_map(polaris_cm_fp_t)
')

# /dev/aikido access
polaris_aikido_dev_use(polaris_cm_fp_t)
```

```

optional_policy(`
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_fp_t)
`)

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(`
polaris_serdes_asic_key_tmp_manage(polaris_cm_fp_t)
`)

type polaris_hkp_device_t;
dev_node(polaris_hkp_device_t)

# access /dev/iocp0
optional_policy(`
polaris_spa_dev_use(polaris_cm_fp_t)
`)

optional_policy(`
# access /dev/hkp
polaris_hkp_dev_use(polaris_cm_fp_t)

polaris_n2_dev_use(polaris_cm_fp_t)
polaris_cy2213_dev_use(polaris_cm_fp_t)
polaris_ddr_dev_use(polaris_cm_fp_t)
polaris_vega_dev_use(polaris_cm_fp_t)
`)

polaris_firmware_read(polaris_cm_fp_t)

# allow access to /csl_p_0/vcpu_template.txt
polaris_iosd_vcpu_read(polaris_cm_fp_t)

# allow Cabo access to i2c semaphores
ifdef(`cabo_platform',`
polaris_i2c_sem_manage(polaris_cm_fp_t)
`)

ifdef(`sumatra_platform',`
# access huron fpga on sumatra
polaris_huron_dev_use(polaris_cm_fp_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmfp.te
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#

```

```
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#
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#
```

```
# polarizezmancc file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarizezmancc.fc
```

```
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```

```
#
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#
```

```
policy_module(polarisripc, 1.0);
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisripc.te
```

```
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```

```
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#
```

```
# polarisripc file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisripc.fc
```

```
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```

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
divert(-1)
```

```
include(`polaris_process.m4')
include(`polaris_process_fc.m4')
```

```

include(`polaris_ipc_mqipc.m4')
include(`polaris_ipc_mqipc_fc.m4')

include(`polaris_ipc_ripc.m4')
include(`polaris_ipc_ripc_fc.m4')

include(`polaris_ipc_lipc.m4')
include(`polaris_ipc_lipc_fc.m4')

dnl Stub out non existent one
define(`polaris_websocket_service_server',`)
define(`polaris_cipc_service_server',`)

include(`polaris_max_scope.m4')

divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_fc.m4
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#
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#
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#

policy_module(polarisstorage, 1.0);

#####
# Persistent storage policy
#####
attribute polaris_disk;

# Default disk types

type polaris_disk_bootflash_t;
polaris_disk_type(polaris_disk_bootflash_t)

type polaris_disk_varied_t;
polaris_disk_type(polaris_disk_varied_t)

```

```
type polaris_disk_harddisk_t;
polaris_disk_type(polaris_disk_harddisk_t)

type polaris_disk_csl_p_t;
polaris_disk_type(polaris_disk_csl_p_t)

type polaris_disk_csl_s_t;
polaris_disk_type(polaris_disk_csl_s_t)

type polaris_disk_objstore_t;
polaris_disk_type(polaris_disk_objstore_t)

type polaris_disk_crashinfo_t;
polaris_disk_type(polaris_disk_crashinfo_t)

type polaris_disk_license_t;
polaris_disk_type(polaris_disk_license_t)

type polaris_disk_ucose_t;
polaris_disk_type(polaris_disk_ucose_t)

type polaris_disk_recovery_t;
polaris_disk_type(polaris_disk_recovery_t)

type polaris_disk_config_t;
polaris_disk_type(polaris_disk_config_t)

# Persistent files types
type polaris_system_report_t;
polaris_pfile_type(polaris_system_report_t)

type polaris_core_file_t;
polaris_pfile_type(polaris_core_file_t)

type polaris_debug_conf_t;
polaris_pfile_type(polaris_debug_conf_t)

type polaris_packages_conf_t;
polaris_pfile_type(polaris_packages_conf_t)

type polaris_grub_efi_t;
polaris_pfile_type(polaris_grub_efi_t)

# we label .ssh files residing on persistent storage as ssh_home_t
# and sshd_key_t
#
# below statement could/should be moved into ssh te file?
gen_require(`
```

```

    type ssh_home_t;
    type sshd_key_t;
)
polaris_disk_type(ssh_home_t)
polaris_disk_type(sshd_key_t)

# handling /bootflash directory - created by systemd unit, note normally
# something will be mounted on top of it, but in some cases like RP2 line
# cards it will be ramfs directory.
gen_require(
    type root_t;
    type unconfined_service_t;
)
filetrans_pattern(unconfined_service_t, root_t, polaris_disk_bootflash_t, dir, "bootflash")

# nfsd accesses different persistent storage directories and it needs getattr
gen_require(
    type nfsd_t;
)
polaris_persistent_getattr(nfsd_t)

# on qwlc /misc/scratch symbolic link created by systemd-tmpfile, but then
# removed and recreated by harddisk mount systemd unit
gen_require(
    type unconfined_service_t;
    type mnt_t;
)
filetrans_pattern(unconfined_service_t, mnt_t, polaris_disk_bootflash_t, lnk_file, "scratch")

gen_require(
    type polaris_conf_t;
    type tmp_t;
)
filetrans_pattern(polaris_conf_t, tmp_t, polaris_packages_conf_t, file, "packages.conf")

# first time creation of /bootflash/core directory
gen_require(
    type initrc_t;
    type init_t;
)
filetrans_pattern({initrc_t init_t unconfined_service_t}, {polaris_disk_bootflash_t polaris_disk_harddisk_t} ,
polaris_core_file_t, dir, "core")

gen_require(
    type init_t;
)
files_tmp_filetrans(init_t, polaris_packages_conf_t, file, "packages.conf")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisstorage.te

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#

/usr/binos/conf/run\_ioxn\_gs\_ha.sh -- gen\_context(system\_u:object\_r:polaris\_gsd\_rp\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.fc

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#  
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#

/usr/cpp/bin/cpp\_sp\_svr -- gen\_context(system\_u:object\_r:polaris\_cpp\_sp\_exec\_t,s0)  
/usr/cpp/bin/cpp\_sp\_svr\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_sp\_exec\_t,s0)  
/usr/cpp/bin/cpp\_sp\_svr\_us\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_sp\_exec\_t,s0)  
/usr/cpp/bin/cpp\_sp\_svr\_vwlc -- gen\_context(system\_u:object\_r:polaris\_cpp\_sp\_exec\_t,s0)  
/usr/cpp/bin/cpp\_sp\_svr\_vwlc\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_sp\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppsp.fc

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#  
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#

## <summary>Polaris Btrace Policy Rules.</summary>

#####  
# Btrace policy  
#####  
  
#####

```

## <summary>
##   Manage btrace auxiliary files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_manage`,`
gen_require(`
  type polaris_btrace_base_t;
  type polaris_btrace_tmpfs_t;
  type tmpfs_t;
`)

  manage_dirs_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)

  # work with cache files and dirs under /tmp/tmppub, like /tmp/tmppub/libs_cache
  polaris_btrace_tmppub_manage($1)

  fs_tmpfs_filetrans($1, polaris_btrace_tmpfs_t, file, "oper_uid_shm")
  manage_files_pattern($1, tmpfs_t, polaris_btrace_tmpfs_t)
  allow $1 polaris_btrace_tmpfs_t:file map;
)

#####
## <summary>
##   Manage temporary (not yet persistent) btrace files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_manage_all`,`

  polaris_btrace_data_manage($1)

gen_require(`
  attribute polaris_btrace_data_domain;
  type polaris_btrace_base_t;
`)

  manage_files_pattern($1, polaris_btrace_base_t, polaris_btrace_data_domain)

```

```

manage_lnk_files_pattern($1, polaris_btrace_base_t, polaris_btrace_data_domain)
allow $1 polaris_btrace_data_domain:file map;

# create temporary files in trace directory
manage_files_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)
manage_lnk_files_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)

# watch btrace data directory for changes
allow $1 polaris_btrace_base_t:dir watch;
)

```

```
#####
```

```

## <summary>
##   Manage btrace persistent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_persistent_data_manage`,`
gen_require(`
type polaris_btrace_data_t;
)

```

```

manage_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
manage_files_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
)

```

```
#####
```

```

## <summary>
##   Read btrace persistent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_persistent_data_read`,`
gen_require(`
type polaris_btrace_data_t;
)

```

```

search_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)

```

```

        read_files_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
    ')

#####
## <summary>
##   Search btrace persitent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_persistent_data_search`,`
    gen_require(`
        type polaris_btrace_data_t;
    `)

    search_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
')

#####
## <summary>
##   Search tracelogs directions in bootflash, harddisk or crashinfo
## directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_search_tracelogs`,`
    gen_require(`
        type polaris_disk_harddisk_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_crashinfo_t;
    `)

    search_dirs_pattern($1, polaris_disk_harddisk_t, polaris_btrace_data_t)
    search_dirs_pattern($1, polaris_disk_bootflash_t, polaris_btrace_data_t)
    search_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_btrace_data_t)
')

#####
## <summary>

```

```

##   Manage btrace boot level config files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_lvl_config_manage',`
gen_require(`
type polaris_btrace_lvl_config_t;
        type polaris_btrace_data_t;
)

manage_dirs_pattern($1, polaris_btrace_lvl_config_t, polaris_btrace_lvl_config_t)
manage_files_pattern($1, polaris_btrace_lvl_config_t, polaris_btrace_lvl_config_t)
        filetrans_pattern($1, polaris_btrace_data_t, polaris_btrace_lvl_config_t, dir, "level_config")

        polaris_btrace_search_tracelogs($1)

        polaris_disk_bootflash_read_lnk($1)
        polaris_disk_harddisk_read_lnk($1)
        polaris_disk_crashinfo_read_lnk($1)
)

#####
## <summary>
##   Read ldb_tmp btrace meta data files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_ldb_tmp_read',`
gen_require(`
type polaris_ldb_tmp_t;
)

        read_files_pattern($1, polaris_ldb_tmp_t, polaris_ldb_tmp_t)
)

#####
## <summary>

```

```

## Read and write all btrace or pman fifo file, used as
## standard input/output.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_btrace_fifo`,`
gen_require(`
type polaris_fifo_stdout_t;
`)

allow $1 polaris_fifo_stdout_t:fifo_file { rw_term_perms lock append create unlink getattr };

# For pmanlite, allow pmans grand-children to be able to operate on
# pipe created by pman.
polaris_use_pman_fifo($1
)

#####
## <summary>
## Execute create_luid_file_db in the its domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_create_ldb_domtrans`,`
gen_require(`
type polaris_create_ldb_t, polaris_create_ldb_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_create_ldb_exec_t, polaris_create_ldb_t)
)

#####
## <summary>
## Make the specified type usable as btrace data file type.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.

```

```

## </summary>
## </param>
#
interface(`polaris_btrace_data_type',`
    files_type($1)
    gen_require(`
        attribute polaris_btrace_data_domain;
    `)
    typeattribute $1 polaris_btrace_data_domain;
`)

#####
## <summary>
## Process to manage its own btrace files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="file_type">
## <summary>
## File type of btrace that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_client',`
    gen_require(`
        type polaris_btrace_base_t;
    `)

    manage_files_pattern($1, polaris_btrace_base_t, $2)
    manage_lnk_files_pattern($1, polaris_btrace_base_t, $2)
    filetrans_pattern($1, polaris_btrace_base_t, $2, { file lnk_file })

    # all clients check for /tmp/rp/trace/publish/timed/enabled control
    # file presense, created by btman, may need its own type
    gen_require(`
        type polaris_btman_bt_t;
    `)
    getattr_files_pattern($1, polaris_btrace_base_t, polaris_btman_bt_t)

    allow $1 $2:file map;
`)

#####
## <summary>

```

```

## Process to manage its own btrace files
## </summary>
## <param name="domain_stem">
## <summary>
## Steam of domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_client_template',`
gen_require(`
    attribute polaris_btrace_data_domain;
    type polaris_btrace_base_t;
`)

    type polaris_$1_bt_t;
    polaris_btrace_data_type(polaris_$1_bt_t)

    polaris_btrace_data_client(polaris_$1_t, polaris_$1_bt_t)
)

#####
## <summary>
## Execute mcp_trace_request.sh in its domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_trace_request_domtrans',`
gen_require(`
    type polaris_trace_request_t, polaris_trace_request_exec_t;
`)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_trace_request_exec_t, polaris_trace_request_t)
)

#####
## <summary>
## Watch btrace directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.

```

```

## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_watch`,`
gen_require(`
    type polaris_btrace_base_t;
    type polaris_btrace_data_t;
`)
    allow $1 polaris_btrace_base_t:dir watch;
    allow $1 polaris_btrace_data_t:dir watch;
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtrace.if

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```

#
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#
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#

```

```

policy_module(polaristamsrp, 1.0);

```

```

gen_require(`
    type polaris_tams_rp_t;
`)

```

```

polaris_btrace_data_manage(polaris_tams_rp_t)
polaris_crft_data_manage(polaris_tams_rp_t)
polaris_chasfs_manage(polaris_tams_rp_t)
polaris_tdlresolve_read(polaris_tams_rp_t)
polaris_tdlldb_list_dirs(polaris_tams_rp_t)
polaris_flashlib_read(polaris_tams_rp_t)
polaris_cpld_read(polaris_tams_rp_t)

```

```

polaris_rpc_sman_ui_serv_connect(polaris_tams_rp_t)

```

```

# tams_tamc_tipc_listener_init function create tipc socket
allow polaris_tams_rp_t self:socket { bind create listen accept getattr read write };

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamsrp.te

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```

#

```

```

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#
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#

policy_module(polaris_iomd, 1.0);

gen_require(`
    type polaris_iomd_t;
`)

polaris_btrace_data_manage(polaris_iomd_t)
polaris_crft_data_manage(polaris_iomd_t)
polaris_chasfs_manage(polaris_iomd_t)
polaris_tdlresolve_read(polaris_iomd_t)
polaris_tdlldb_list_dirs(polaris_iomd_t)
polaris_cpld_read(polaris_iomd_t)
polaris_flashlib_read(polaris_iomd_t)

polaris_ripc_sman_ui_serv_connect(polaris_iomd_t)

polaris_db_tdlldb_dir_use(polaris_iomd_t)

polaris_dyncfg_tmp_read(polaris_iomd_t)
optional_policy(`
polaris_spa_dev_use(polaris_iomd_t)
`)

# allow objstore access
polaris_disk_objstore_read(polaris_iomd_t)

polaris_ngio_dev_use(polaris_iomd_t)

# deals with /dev/shm files semaphors; like uuid_sem semaphore
# created by btrace_get_uuid function
type polaris_iomd_tmpfs_t;
files_tmpfs_file(polaris_iomd_tmpfs_t)
fs_tmpfs_filetrans(polaris_iomd_t, polaris_iomd_tmpfs_t, file)
manage_files_pattern(polaris_iomd_t, tmpfs_t, polaris_iomd_tmpfs_t)
# sem_open through where_is_shmfs does stat on /dev/shm
fs_getattr_tmpfs(polaris_iomd_t)

#allow /dev/i2c device file
polaris_i2c_use(polaris_iomd_t)

#ifdef(^ngwc_family)`
# On Macallan platforms the following api call from iomd process,

```

```

# ngmodslot_is_upper_sup_present() does a read access of /dev/cpld
polaris_cpld_dev_read(polaris_iomd_t)
polaris_cpld_dev_use(polaris_iomd_t)

#allow cpp tmp file
polaris_cpp_tmp_files_use(polaris_iomd_t)

# In Macallan cards which use Doppler ASIC,
# IOMD module uses ngmod_doppler_mmap() api to get hold of
# MMapped Asic address. As part of the operation it uses
# /dev/chdrvmmmap device.
polaris_chdrvmmmap_dev_use(polaris_iomd_t)

# IOMD module invokes ASIC Scan functionality
# and calls asic_register_intr_handler () , which
# needs to access the doppler MSI devices
# /dev/msi/Slot[0-9]*/Doppler[0-9]/Group[0-9]
polaris_dplr_dev_use(polaris_iomd_t)
# but above still not enough at some point
# device like /dev/msi/Slot8/Doppler0/Group0 still
# considered as device_t, not clear need to look a bit more
dev_rw_generic_chr_files(polaris_iomd_t)

# on macallan iomd needs access to /dev/cisco/dplriomem
# for mapping dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_iomd_t);

# IOMD calls ngmod_obfl_errmssg_app_init() to initialize
# OBFL.
polaris_obfl_data_manage(polaris_iomd_t)

# IOMD fast path code invokes ngmod_fastpath_thread_func(),
# which increases the scheduler priority.
allow polaris_iomd_t self:capability sys_nice;
allow polaris_iomd_t self:process setsched;

# on macallan iomd needs access to /dev/cisco/fpga_iomem
# for mapping FPGA io memory to application space.
polaris_fpga_iomem_mmapfpga_dev_use(polaris_iomd_t);

optional_policy(`
# ASIC related mmap code in IOMD needs to acces PCI scan related
# rescan shm mutex
polaris_cm_cc_tmpfs_manage(polaris_iomd_t)
')
')

# both utah and macallan text relocations in libcpp_common_os.so

```

```

ifdef(`crankshaft_family',`
polaris_icc_broken_relocations(polaris_iomd_t)
# Nightwatch switch module needs to access the doppler devices
polaris_dplr_dev_use(polaris_iomd_t)
dev_rw_generic_chr_files(polaris_iomd_t)
allow polaris_iomd_t self:capability sys_nice;
allow polaris_iomd_t self:process setsched;
')

optional_policy(`
# Allow /dev/dmabmap access
polaris_dmabmap_dev_use(polaris_iomd_t)
')

optional_policy(`
# on starfleet access gettysburg_fpga
polaris_gettysburg_fpga_dev_use(polaris_iomd_t)
')

type polaris_iomd_tmp_t;
files_tmp_file(polaris_iomd_tmp_t)
manage_dirs_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)
manage_files_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)
manage_fifo_files_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)

# on macallan MRVL88X5113_DRV_PRINT macro outputs into /tmp/mrvl88x5113.log file
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, file, "mrvl88x5113.log")

logging_send_syslog_msg(polaris_iomd_t)

ifdef(`ngwc_family',`
# from in115050_test_app_thread_create in
# drivers/userspace/inphi/dev_ephy_in115050/src/dev_ephy_in115050.c
# For macallan in115025_test_app_thread_create in
# drivers/userspace/inphi/dev_ephy_in115025/src/dev_ephy_in115025.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_inphi")

# In case of starfleet fixed the following module creates folder in /tmp
# /drivers/userspace/mrvl_phy/dev_ephy_mrvl88ec808/src/dev_ephy_m88ec808.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_mrvlphy")

#allow access to /tmp/serdes_asic_key_dir as this path is used both by
#cman_fp for programming DPP serdes and IOMD for programming n/w serdes
optional_policy(`
polaris_serdes_asic_key_tmp_manage(polaris_iomd_t)
')

#Doppler E mac creates lockfiles with names following

```

```

#the pattern /tmp/nug_asic_key_dir/nug_asic_key_[0-9]_[0-9]_[0-9]
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "nug_asic_key_dir")

#Doppler ES mac creates lockfiles with names following
#the pattern /tmp/rmt_asic_key_dir/rmt_asic_key_[0-9]_[0-9]_[0-9]
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "rmt_asic_key_dir")

# from etopus_spawn_serdes_tool_thread in
# binos/platforms/ngwc/doppler_sdk/drivers/serdes/Vendor/src/etopus_serdes.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_etp")

#on starfleet access /dev/cpld, in iomd_starfleet_create_mmap()
polaris_cpld_dev_use(polaris_iomd_t)
')

optional_policy(
polaris_ngwc_itfpo_manage(polaris_iomd_t)
')

# ngio device
type polaris_ngio_device_t;
dev_node(polaris_ngio_device_t)

#For NGIO modules iomd uses netlink socket (via backplane switch)
allow polaris_iomd_t self:netlink_socket { bind create };

ifdef(^sumatra_platform',`
#on Sumatra access /dev/cpld from iomd
polaris_cpld_dev_use(polaris_iomd_t)
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_iomd_t)
polaris_sumatra_doppler_dev_use(polaris_iomd_t)

#access SERDES /tmp/serdes_asic_key_dir/*
polaris_serdes_asic_key_tmp_manage(polaris_iomd_t)

# access /dev/huron_fpga
polaris_huron_dev_use(polaris_iomd_t)

# manage "sysctrl_i2c.lck"
gen_require(
    type polaris_cm_rp_tmp_t;
)
files_tmp_filetrans(polaris_iomd_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_iomd_t)

# comm="iomd" kmod="netdev-bp246"
kernel_request_load_module(polaris_iomd_t)

```

```
# work with /sys/devices/i2c-15/15-0076/...
dev_rw_sysfs(polaris_iomd_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiomd.te
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```

dnl

dnl April 2018, Victor Kamensky

dnl

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```
define(`polaris_lipc_service_server_many',
    `ifelse($3, `',
        polaris_lipc_create_name(dollarsone, $1, "$2"),
        polaris_lipc_create_name(dollarsone, $1, "$2-b$3")
        `ifelse($3, 0, `polaris_lipc_create_name(dollarsone, $1, "$2")', `polaris_lipc_service_server_many($1, $2,
eval($3 - 1))')')')
```

```
define(`polaris_lipc_service_server_aux',`dnl
```

```
#####
```

```
## <summary>
```

```
## Create $2 lipc chanell.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <infoflow type="none"/>
```

```
#
```

```
interface(`polaris_lipc_$1_create_name',`
```

```
gen_require(
    type $2;
```

```
')
```

```
    $3
```

```
")
```

```
#####
```

```
## <summary>
```

```
## Write $2 lipc chanell.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```

## </summary>
## </param>
## <param name="server">
##   <summary>
##     Domain of owner of lipc channel.
##   </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_lipc_${1}_write`,`
  gen_require(`
    type $2;
  `)

  polaris_lipc_write(dollarsone, $2, dollarstwo)
`)

define(`polaris_lipc_service_server`,`dnl
polaris_lipc_service_server_aux(lipc_stem($1), lipc_label($1),
    polaris_lipc_service_server_many(lipc_label($1), $5, max_scope_map($3, $4, $2)))')

define(`polaris_lipc_service_client`,``)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_lipc\_if.m4

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```

#
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#

```

```

policy_module(polarisncd, 1.0);

```

```

gen_require(`
  type polaris_ncd_t;
`)

```

```

# allow snpt transition in its own domain when started by ncd
ntp_domtrans_ntpdate(polaris_ncd_t)

```

```

corecmd_exec_bin(polaris_ncd_t)
corecmd_exec_shell(polaris_ncd_t)

```

```

# run ldd, which in turns execve "ld.so --verify"

```

```

libs_exec_ld_so(polaris_ncd_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_ncd_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_ncd_t)

# work with /tmp files (/tmp/ncd)
type polaris_ncd_tmp_t;
files_tmp_file(polaris_ncd_tmp_t)
manage_dirs_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)
manage_files_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)
manage_fifo_files_pattern(polaris_ncd_t, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, file)

# create /tmp/ncd and /tmp/etc/ncd_work_dir directories
gen_require(
    type polaris_etc_t;
)
manage_dirs_pattern(polaris_ncd_t, { tmp_t polaris_etc_t }, polaris_ncd_tmp_t)
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, dir, "ncd")
# /tmp/etc/ncd_work_dir
filetrans_pattern(polaris_ncd_t, polaris_etc_t, polaris_ncd_tmp_t, dir, "ncd_work_dir")

# work with /tmp/ncd/inot_fifo
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, fifo_file, "inot_fifo")
manage_fifo_files_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)

# allow snpt to read out fifo file
gen_require(
    type ntpd_t;
)
read_fifo_files_pattern(ntpd_t, polaris_ncd_tmp_t, polaris_ncd_tmp_t)

# work with /tmp/ufs directory. the ufs directory can be created
# by both polaris_ncd_t and udev_t subjects (depending upon platform
# logic)
gen_require(
    type udev_t;
    type unconfined_service_t;
)
files_tmp_filetrans( { polaris_ncd_t udev_t unconfined_service_t }, polaris_ncd_tmp_t, dir, "ufs")

polaris_btrace_data_manage(polaris_ncd_t)
polaris_chasfs_manage(polaris_ncd_t)
polaris_cpld_read(polaris_ncd_t)
polaris_proc_rmonbifo_read(polaris_ncd_t)

```

```

polaris_rmonbifo_tmp_read(polaris_ncd_t)
polaris_boot_tmp_read(polaris_ncd_t)
polaris_disk_crashinfo_getattr(polaris_ncd_t)
polaris_disk_bootflash_read_lnk(polaris_ncd_t)
polaris_flashlib_lock(polaris_ncd_t)
polaris_flashlib_read(polaris_ncd_t)
polaris_read_debug_conf(polaris_ncd_t)
polaris_read_packages_conf(polaris_ncd_t)

brctl_domtrans(polaris_ncd_t)
sysnet_domtrans_ifconfig(polaris_ncd_t)

# ncd.sh invokes ifup which in turn is calling dhclient
sysnet_domtrans_dhpcp(polaris_ncd_t)

type polaris_ncd_etc_t;
files_config_file(polaris_ncd_etc_t)
gen_require(
    attribute domain;
)
files_etc_filetrans(domain, polaris_ncd_etc_t, file, "mount_data")
manage_dirs_pattern(polaris_ncd_t, polaris_ncd_etc_t, polaris_ncd_etc_t)
manage_files_pattern(polaris_ncd_t, polaris_ncd_etc_t, polaris_ncd_etc_t)

# runs exportsfs command
rpc_read_exports(polaris_ncd_t)
rpc_write_exports(polaris_ncd_t)
rpc_manage_nfs_state_data_dir(polaris_ncd_t)
rpc_manage_nfs_state_data(polaris_ncd_t)
fs_rw_nfsd_fs(polaris_ncd_t)
kernel_rw_rpc_sysctls(polaris_ncd_t)
fs_getattr_xattr_fs(polaris_ncd_t)

# reloads xinetd@/tmp/etc/xinetd.conf.consolidated.service and
# systemctl reload xinetd_brelay@eobc.service
systemd_exec_systemctl(polaris_ncd_t)
systemd_reload_all_services(polaris_ncd_t)
systemd_status_all_unit_files(polaris_ncd_t)

polaris_chvrf_domtrans(polaris_ncd_t)
# ncd process calls ifconfig and route and mcp_chvrf
gen_require(
    type polaris_chvrf_t;
)
sysnet_domtrans_ifconfig(polaris_chvrf_t)
allow polaris_chvrf_t self:capability net_admin;
allow polaris_chvrf_t self:udp_socket { create ioctl };
allow polaris_ncd_t self:process setpgid;

```

```

polaris_persistent_getattr(polaris_ncd_t)

# access to /etc/sysconfig/network-scripts
sysnet_read_config(polaris_ncd_t)

fs_getattr_tmpfs(polaris_ncd_t)

# manage file under /tmp/etc/ncd_work_dir
gen_require(
    type initrc_tmp_t;
    type initrc_t;
)
filetrans_pattern(polaris_ncd_t, initrc_tmp_t, polaris_ncd_tmp_t, dir,"ncd_work_dir")
polaris_ncd_tmp_manage(polaris_ncd_t)
# /tmp/root/loopback is created by initrc_t,but managed by ncd.sh.
# dynamic label directory "/tmp/root/loopback" as polaris_ncd_tmp_t
files_tmp_filetrans(initrc_t, polaris_ncd_tmp_t, dir, "loopback")
# flashutil has wrong file permission
allow polaris_ncd_t self:capability { dac_override sys_resource };

# access to /tmp/etc/xinetd.conf.consolidated
init_read_script_tmp_files(polaris_ncd_t)

allow polaris_ncd_t self:capability net_admin;

# search/getattr of /tmp/udev/etc/udev
polaris_udev_tmp_list_dirs(polaris_ncd_t)

# ncd calls mount to handle nfs directories
mount_domtrans(polaris_ncd_t)

#rsync_exec(polaris_ncd_t)
gen_require(
    type rsync_t;
    type rsync_tmp_t;
)
rsync_entry_domtrans(polaris_ncd_t, rsync_t)
allow rsync_t polaris_ncd_t:process sigchld;
# file descriptor leak when rsync is called
allow rsync_t polaris_ncd_t:fifo_file write;
# PLEASE LOOK AT ME: probably /tmp/rp/active_epoch deserves its own type
# /tmp/rp/active_epoch on its way to /tmp/chassis/local/rp/chasfs/rp/0/0/epoch
manage_files_pattern(polaris_ncd_t, rsync_tmp_t, rsync_tmp_t)

# creates files under /tmp/udev/etc/udev/
polaris_udev_tmp_manage(polaris_ncd_t)
allow polaris_ncd_t self:process setfscreate;

```

```

# run /sbin/hwclock in its own domain
clock_domtrans(polaris_ncd_t)
# stdin file descriptor leak when hwclock started
gen_require(
    type hwclock_t;
)
allow hwclock_t polaris_ncd_tmp_t:fifo_file read;

ifdef(`ngwc_family',`
polaris_getattr_filesystem_disk_ucode(polaris_ncd_t)
')

# update /tmp/etc/xinetd.conf.consolidated file
polaris_etc_append(polaris_ncd_t)

# ncd.sh adds entries to /etc/exports file
gen_require(
    type etc_t;
)
append_files_pattern(polaris_ncd_t, etc_t, etc_t)

# create and write into /tmp/unifiedfs/unifiedfs_log
manage_files_pattern(polaris_ncd_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)

polaris_ncd_rpcinfo_net(polaris_ncd_t)

# accessing /mnt/usb0
fs_search_removable(polaris_ncd_t)
polaris_getattr_removable(polaris_ncd_t)
polaris_getattr_removable(polaris_ufs_helper_t)

# ncd.sh calls ps command
# ps needs access to /sys/devices/system/cpu/online
# write/create to "/sys/module/nfs/parameters/nfs4_unique_id"
dev_rw_sysfs(polaris_ncd_t)
dev_manage_sysfs_dirs(polaris_ncd_t)
gen_require(
    type sysfs_t;
)
create_files_pattern(polaris_ncd_t, sysfs_t, sysfs_t)

# ps needs access to proc_t
kernel_read_system_state(polaris_ncd_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_ncd_t)

# send signal to ntpd

```

```

ntp_signal(polaris_ncd_t)

# ncd.sh executes hostname
hostname_exec(polaris_ncd_t)

# ncd.sh runs mcp_trace_request.sh
polaris_trace_request_domtrans(polaris_ncd_t)

# handling /usr/binos/conf/iosd_console_attach.sh

polaris_utility_domain_template(console_attach)

polaris_bexecute_domain(polaris_console_attach_t, polaris_console_attach_exec_t)

corecmd_exec_bin(polaris_console_attach_t)
auth_use_nsswitch(polaris_console_attach_t)

# execute ping over liin: usr/binos/conf/mcp_chvrf.sh liin /bin/ping -c 1 -w 300 192.168.1.6
polaris_chvrf_domtrans(polaris_console_attach_t)
# from chvrf.sh code executes ping command
gen_require(
    type polaris_chvrf_t;
)
netutils_domtrans_ping(polaris_chvrf_t)
# send sigchld when it is done
gen_require(
    type ping_t;
)
allow ping_t polaris_console_attach_t:process sigchld;

polaris_boot_tmp_read(polaris_console_attach_t)
polaris_btrace_data_manage(polaris_console_attach_t)
polaris_chasfs_read(polaris_console_attach_t)
polaris_cpld_read(polaris_console_attach_t)
polaris_disk_bootflash_search(polaris_console_attach_t)
polaris_disk_crashinfo_getattr(polaris_console_attach_t)
polaris_ncd_tmp_read(polaris_console_attach_t)
polaris_read_debug_conf(polaris_console_attach_t)
polaris_rmonbifo_tmp_read(polaris_console_attach_t)
polaris_use_btrace_fifo(polaris_console_attach_t)

# read /proc/cmdline
kernel_read_system_state(polaris_console_attach_t)

# read /tmp/myhostname file
polaris_hm_tmp_read(polaris_console_attach_t)

telnet_use_ptys(polaris_console_attach_t)

```

```

allow polaris_console_attach_t self:capability sys_resource;
allow polaris_console_attach_t self:process setrlimit;

# getty starts /usr/binos/conf/iosd_console_attach.sh through breelay
gen_require(^
    type getty_t;
    ')
polaris_bconsole_domtrans(getty_t)

# console_attach.sh start btelnet.sh over chvrf and bexecute
gen_require(^
    type polaris_bexecute_t;
    ')
allow polaris_bexecute_t polaris_console_attach_t:process sigchld;
corenet_tcp_connect_telnetd_port(polaris_bexecute_t)

# handling /usr/binos/conf/unifiedfs/unifiedfs_helper.sh

polaris_utility_domain_template(ufs_helper)

corecmd_exec_bin(polaris_ufs_helper_t)
auth_use_nsswitch(polaris_ufs_helper_t)

# rsync calls unifiedfs_helper.sh
gen_require(^
    type rsync_t;
    ')
polaris_ufs_helper_domtrans(rsync_t);

# unifiedfs_helper.sh calls mount to handle nfs directories
mount_domtrans(polaris_ufs_helper_t)

# creates files under /tmp/udev/etc/udev/
polaris_udev_tmp_manage(polaris_ufs_helper_t)

polaris_disk_bootflash_search(polaris_ufs_helper_t)
polaris_ncd_tmp_manage(polaris_ufs_helper_t)
polaris_ncd_etc_read(polaris_ufs_helper_t)

# stat over /tmp/ufs/crashinfo/10.1.1.1
polaris_disk_crashinfo_getattr(polaris_ufs_helper_t)

# unifiedfs_helper.sh creates /tmp/unifiedfs and manages underlying dirs
type polaris_ufs_tmp_t;
files_tmp_file(polaris_ufs_tmp_t)
files_tmp_filetrans(polaris_ufs_helper_t, polaris_ufs_tmp_t, { file dir })
manage_dirs_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)

```

```
manage_files_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)
manage_lnk_files_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)
```

```
# Required for /tmp/unifiedfs access on vWLC
#ifdef(`vwlc_platform',`
files_tmp_filetrans(unconfined_service_t, polaris_ufs_tmp_t, dir, "unifiedfs")
')
```

```
polaris_ncd_rpcinfo_net(polaris_ufs_helper_t)
```

```
polaris_persistent_getattr(polaris_ufs_helper_t)
```

```
# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_ufs_helper_t)
```

```
# ncd.sh read,search,open, creates, add_name and writes to /proc/hanet/tun_local_ip
gen_require(`
type polaris_hanet_proc_t;
type proc_t;
')
```

```
manage_files_pattern(polaris_ncd_t, polaris_hanet_proc_t, polaris_hanet_proc_t)
allow polaris_hanet_proc_t proc_t:filesystem associate;
```

```
allow polaris_ufs_helper_t self:capability sys_resource;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisncd.te
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```

dnl

dnl May 2018, Manohar Hungund

dnl

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dnl

dnl Starfleet Platform Max Bay Limits

```
max_bay_map_set(`rp', `per_bay', 0)
```

```
max_bay_map_set(`cc', `per_bay', 5)
```

```
max_bay_map_set(`fp', `per_bay', 5)
```

```
min_bay_ripc_map_set(`rp', `per_bay', 0)
```

```
min_bay_ripc_map_set(`cc', `per_bay', 1)
```

```
min_bay_ripc_map_set(`fp', `per_bay', 0)
```

```
max_bay_ripc_map_set(`rp', `per_bay', 2)
```

```
max_bay_ripc_map_set(`cc', `per_bay', 6)
```

```
max_bay_ripc_map_set(`fp', `per_bay', 1)
```

```
min_bay_ripc_map_set(rp, `global', 0)
min_bay_ripc_map_set(cc, `global', 1)
min_bay_ripc_map_set(fp, `global', 0)
```

```
max_bay_ripc_map_set(rp, `global', 2)
max_bay_ripc_map_set(cc, `global', 6)
max_bay_ripc_map_set(fp, `global', 1)
```

```
dnl in elastic scope each process has its own value
max_elastic_map_set(rp, `elastic', BPROC_ODM, 0)
max_elastic_map_set(cc, `elastic', BPROC_ODM, 0)
max_elastic_map_set(fp, `elasitic', BPROC_ODM, 0)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 0)
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 0)
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/starfleetmaps.m4
```

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```
#
# November 2020, Christine Hwang
#
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#
```

```
# Map BBU TTY to correct device context
/dev/ttyS2          -c gen_context(system_u:object_r:polaris_bbu_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbbu.fc
```

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```
#
# February 2018, Manohar Hungund
#
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#
```

```
## <summary>Polaris ACT2 Chip Device Access Policy Rules.</summary>
```

```
#####
# ACT2 Chip Driver policy
#####
```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/act2
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_act2_dev_use`,`
gen_require(`
    type device_t;
    type polaris_act2_device_t;
`)
    read_chr_files_pattern($1, device_t, polaris_act2_device_t)
    write_chr_files_pattern($1, device_t, polaris_act2_device_t)
`)

#####
## <summary>
##   Create /tmp/hw_entropy file. Certain platforms save
##   entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_hw_entropy_create`,`
gen_require(`
    type polaris_hw_entropy_t;
    type tmp_t;
`)
    files_tmp_filetrans($1, polaris_hw_entropy_t, file, "hw_entropy")
    manage_files_pattern($1, tmp_t, polaris_hw_entropy_t)
`)

#####
## <summary>
##   Use /tmp/hw_entropy file. For some reason, iosd opens file in rw mode,
##   not clear why it couldn't just read it.
##   Certain platforms save entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hw_entropy_use`,`
    gen_require(`
        type polaris_hw_entropy_t;
        type tmp_t;
    `)

    rw_files_pattern($1, tmp_t, polaris_hw_entropy_t)
)

#####
## <summary>
## Read /tmp/hw_entropy file.
## Certain platforms save entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hw_entropy_read`,`
    gen_require(`
        type polaris_hw_entropy_t;
    `)

    read_files_pattern($1, tmp_t, polaris_hw_entropy_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisact2.if

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```

#
# April 2017, Victor Kamensky
#
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#

```

```

policy_module(polarisdmindbmand, 1.0);

```

```

gen_require(`
    type polaris_dmi_ndbmand_t;
`)

```

```

polaris_btrace_data_manage(polaris_dmi_ndbmand_t)
polaris_crft_data_manage(polaris_dmi_ndbmand_t)
polaris_chasfs_manage(polaris_dmi_ndbmand_t)
polaris_tdlresolve_read(polaris_dmi_ndbmand_t)
polaris_tdlldb_list_dirs(polaris_dmi_ndbmand_t)
polaris_cpld_read(polaris_dmi_ndbmand_t)
polaris_flashlib_read(polaris_dmi_ndbmand_t)

polaris_ripc_sman_ui_serv_connect(polaris_dmi_ndbmand_t)

polaris_db_tdlldb_dir_use(polaris_dmi_ndbmand_t)

# work with NDBLOAD_LOCK_PATH
type polaris_dmi_ndbutil_lock_t;
files_tmp_file(polaris_dmi_ndbutil_lock_t)
polaris_ndbload_lock_use(polaris_dmi_ndbmand_t)

optional_policy(`
# deals with /dev/shm/confd setup (schema and pid)
polaris_confd_shm_setup(polaris_dmi_ndbmand_t)
# and allow read shared schema
polaris_confd_shared_schema_read(polaris_dmi_ndbmand_t)
# read /proc/confd_pid/exe file
polaris_confd_read(polaris_dmi_ndbmand_t)
`)

allow polaris_dmi_ndbmand_t self:capability { dac_override dac_read_search sys_resource };

logging_send_syslog_msg(polaris_dmi_ndbmand_t)

# create ndbutil directory under /var/lock
polaris_confd_ndbutil_create(polaris_dmi_ndbmand_t)

polaris_ndbutil_lock_template(polaris_dmi_ndbmand_t, ndbmand, ".l.schema_use.ndbmand")

polaris_confd_shared_schema_watch(polaris_dmi_ndbmand_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.te
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#
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#

```

```

policy_module(polarisomp, 1.0);

gen_require(
    type polaris_omp_t;
)
polaris_chasfs_manage(polaris_omp_t)
polaris_cpld_read(polaris_omp_t)
polaris_flashlib_read(polaris_omp_t)
polaris_tdlresolve_read(polaris_omp_t)

polaris_ripc_sman_ui_serv_connect(polaris_omp_t)

polaris_db_tdlldb_dir_use(polaris_omp_t)

logging_send_syslog_msg(polaris_omp_t)

# vconfd_load_shared_schemas
polaris_confd_shared_schema_read(polaris_omp_t)

# omp_daemon_init calls posix_sysconf
dev_read_sysfs(polaris_omp_t)

# reads /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_omp_t)

# vip_util_set_fd_limits set files limits
allow polaris_omp_t self:process setrlimit;

# omp connects to omp listener tcp port 17900
corenet_tcp_connect_polaris_omp_port(polaris_omp_t)
# vip_util_reset_ns opens /proc/1/ns/net
polaris_cedge_reset_ns(polaris_omp_t)
# vip_util_set_ns opens /var/run/netns/*
polaris_cedge_set_ns(polaris_omp_t)

#omp_peer_active_connect() binds to OMP address
corenet_tcp_bind_generic_node(polaris_omp_t)
allow polaris_omp_t self:tcp_socket { bind connect create getopt setopt };

# omp starts worker thread under CPU affinity
allow polaris_omp_t self:process setsched;

# connects to ttm unix domain socket in msgq_connect_timer
polaris_ttm_var_sock_write(polaris_omp_t)
# connects to ftm unix domain socket in msgq_connect_timer
polaris_ftm_var_sock_write(polaris_omp_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisomp.te

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#

# July 2020, Victor Kamensky

#

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#

## <summary>Polaris htx Policy Rules.</summary>

#####

## <summary>

## Manage polaris\_htx\_iox\_tmp\_t in /tmp/HTX-IOX.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

interface(`polaris\_htx\_iox\_tmp\_manage`,`

gen\_require(`

type polaris\_htx\_iox\_tmp\_t;

`)

manage\_files\_pattern(\$1, polaris\_htx\_iox\_tmp\_t, polaris\_htx\_iox\_tmp\_t)

manage\_sock\_files\_pattern(\$1, polaris\_htx\_iox\_tmp\_t, polaris\_htx\_iox\_tmp\_t)

manage\_dirs\_pattern(\$1, polaris\_htx\_iox\_tmp\_t, polaris\_htx\_iox\_tmp\_t)

allow \$1 polaris\_htx\_iox\_tmp\_t:dir watch;

allow \$1 polaris\_htx\_iox\_tmp\_t:file map;

')

#####

## <summary>

## Send messages to htx unix datagram sockets.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_htx\_dgram\_send`,`

gen\_require(`

```

type polaris_htx_t;
)

allow $1 polaris_htx_t:unix_dgram_socket sendto;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/sppi_memif device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_spfi_memif_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_spfi_memif_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_spfi_memif_device_t)
    read_chr_files_pattern($1, device_t, polaris_spfi_memif_device_t)
)

```

```

#####
## <summary>
##   Work with /tmp/HTX-IOX/.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_htx_use_client_socket`,`
    gen_require(`
        type polaris_htx_t;
    `)
    allow $1 polaris_htx_t:unix_stream_socket connectto;
)

```

Found in path(s):  
\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.if  
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```

#
# July 2017, Victor Kamensky

```

```

#
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#

policy_module(polarisesgtamcfg, 1.0);

gen_require(
    type polaris_esg_tam_cfg_t;
)

polaris_btrace_data_manage(polaris_esg_tam_cfg_t)
polaris_chasfs_manage(polaris_esg_tam_cfg_t)
polaris_tdlresolve_read(polaris_esg_tam_cfg_t)
polaris_tdlldb_list_dirs(polaris_esg_tam_cfg_t)
polaris_flashlib_read(polaris_esg_tam_cfg_t)

polaris_cpld_read(polaris_esg_tam_cfg_t)
allow polaris_esg_tam_cfg_t self:capability net_admin;

# handle /tmp/tam_cfg_done
type polaris_tam_tmp_t;
files_tmp_file(polaris_tam_tmp_t)
files_tmp_filetrans(polaris_esg_tam_cfg_t, polaris_tam_tmp_t, dir, "tam_cfg_done")
manage_files_pattern(polaris_esg_tam_cfg_t, polaris_tam_tmp_t, polaris_tam_tmp_t)
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_esg_tam_cfg_t, tmp_t, polaris_tam_tmp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisesgtamcfg.te
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisfmanfp, 1.0);

gen_require(
    type polaris_fman_fp_t;
)

polaris_btrace_data_manage(polaris_fman_fp_t)

```

```

polaris_crft_data_manage(polaris_fman_fp_t)
polaris_chasfs_manage(polaris_fman_fp_t)
polaris_tdlresolve_read(polaris_fman_fp_t)
polaris_tdlldb_list_dirs(polaris_fman_fp_t)
polaris_cpld_read(polaris_fman_fp_t)
polaris_lua_read(polaris_fman_fp_t)
polaris_flashlib_read(polaris_fman_fp_t)

polaris_ripc_sman_ui_serv_connect(polaris_fman_fp_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_fman_fp_t)

#####
# mqipc manual, one that missing in platform tdl file
#####

# mq.-iosd-thr-fmanrp-R0:0
# mq.-iosd-thr-fmanrp-1:R0:0
type polaris_iosd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_iosd_thr_fmanrp_mqipc_t)

# mq.-mobilityd-thr-fmanrp-1:R0:0
type polaris_mobilityd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_mobilityd_thr_fmanrp_mqipc_t)

# mq.-smd-thr-fmanrp-1:R0:0
type polaris_smd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_smd_thr_fmanrp_mqipc_t)

# mq.-wncd_0-thr-fmanrp-1:R0:0
type polaris_wncd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_wncd_thr_fmanrp_mqipc_t)

# mq.-wncmgrd_0-thr-fmanrp-1:R0:0
type polaris_wncmgrd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_wncmgrd_thr_fmanrp_mqipc_t)

polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-3:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-4:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-5:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-6:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-7:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-8:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-R1:0)

```



```
3:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
4:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
5:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
6:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
7:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
8:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncmgrd_thr_fmanrp_mqipc_t, wncmgrd-thr-fmanrp-
R1:0)
```

```
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-3:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-4:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-5:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-6:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-7:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-8:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-R1:0)
```

```
optional_policy(`
```

```
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_2-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_2-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_3-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_3-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_4-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_4-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_5-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_5-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_6-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_6-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_7-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_7-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-R1:0)
`)
```

```
polaris_cpld_dev_use(polaris_fman_fp_t)
```

```
# cpp bleeds into switching platforms through fman_fp and fed
```

```
# apparently even on nyquist fed creates /tmp/cpp_anon_db
```

```
polaris_cpp_process(polaris_fman_fp_t)
```

```

polaris_cpp_tmp_files_use(polaris_fman_fp_t)

optional_policy(
polaris_cpp_dev_use(polaris_fman_fp_t)
polaris_cpp_cavium_sdk_ipc_use(polaris_fman_fp_t)
')
polaris_persistent_manage(polaris_fman_fp_t)

polaris_icc_broken_relocations(polaris_fman_fp_t)

allow polaris_fman_fp_t self:capability dac_override;
allow polaris_fman_fp_t self:capability2 block_suspend;

# when /bootflash or /harddisk are 100% full
allow polaris_fman_fp_t self:capability sys_resource;

# write to devices like this /proc/bus/pci/04/00.0
kernel_read_system_state(polaris_fman_fp_t)
kernel_write_proc_files(polaris_fman_fp_t)

ifdef(^mcp_family',`
polaris_cm_fp_tmp_filetrans(polaris_fman_fp_t)
polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

# LOOK AT ME: raw memory write access
ifdef(^mcp_family',`
polaris_dev_mem_use(polaris_fman_fp_t)
')

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_fman_fp_t)
')

polaris_dyncfg_tmp_read(polaris_fman_fp_t)

# /dev/qae_mem device access on overlord
optional_policy(
polaris_qae_dev_use(polaris_fman_fp_t)
')

# access to /dev/icp_XXX device on crankshaft platforms
optional_policy(
    polaris_icp_dev_use(polaris_fman_fp_t)
')

```

```

# on qwlc work with /tmp/octeon-remote-lock-pci:0
ifdef(`qwlc_platform',`
polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

ifdef(`katar_platform',`
polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

optional_policy(`
#fman-fp creates tmp files in acl-mgmt workflow.
polaris_fman_acl_iptbl_tmp_file(polaris_fman_fp_t)
')

polaris_iosd_vcpu_read(polaris_fman_fp_t)

# allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_fman_fp_t)
fs_search_cgroup_dirs(polaris_fman_fp_t)

optional_policy(`
# Access /dev/cbdma
polaris_cbdma_dev_use(polaris_fman_fp_t)

# Access /dev/n2_device
polaris_n2_dev_use(polaris_fman_fp_t)
')
polaris_cpp_tmpfs_manage(polaris_fman_fp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.te
No license file was found, but licenses were detected in source scan.

#
# August 2017, Shawn Lu
#
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#

## <summary>Polaris wncmgrd Policy Rules.</summary>

#####
## <summary>
## Read access to /bootflash/NACert.pem
## </summary>
## <param name="domain">
## <summary>

```

```
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_read_icap_cert_file`,`
    gen_require(`
        type polaris_icap_cert_t;
    `)
    allow $1 polaris_icap_cert_t:file read_file_perms;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswncmgrd.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

# polariskeyman file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariskeyman.fc

No license file was found, but licenses were detected in source scan.

```
#
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#
```

# polarisnvram file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnvram.fc

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```
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#
```

```

# /3pa staff
/3pa/usr/(.*)?lib64/(.*)? -- gen_context(system_u:object_r:lib_t,s0)
/3pa/usr/(.*)?lib/(.*)? -- gen_context(system_u:object_r:lib_t,s0)
/3pa/(.*)?lib64/(.*)? -- gen_context(system_u:object_r:lib_t,s0)
/3pa/(.*)?lib/(.*)? -- gen_context(system_u:object_r:lib_t,s0)
/3pa/usr/(.*)?sbin/(.*)? -- gen_context(system_u:object_r:bin_t,s0)
/3pa/usr/(.*)?bin/(.*)? -- gen_context(system_u:object_r:bin_t,s0)
/3pa/usr/sbin/libvirt_lxc -- gen_context(system_u:object_r:virt_d_lxc_exec_t,s0)
/usr/lib/libvirt/libvirt_lxc -- gen_context(system_u:object_r:virt_d_lxc_exec_t,s0)
/usr/sbin/libvirt_lxc -- gen_context(system_u:object_r:virt_d_lxc_exec_t,s0)
/3pa/usr/sbin/libvirt -- gen_context(system_u:object_r:virt_d_exec_t,s0)
/3pa/usr/sbin/virtlogd -- gen_context(system_u:object_r:virtlogd_exec_t,s0)
/3pa/usr/bin/virsh -- gen_context(system_u:object_r:virsh_exec_t,s0)
/3pa/usr/bin/qemu.* -- gen_context(system_u:object_r:qemu_exec_t,s0)
/usr/binos/conf/libvirt.sh -- gen_context(system_u:object_r:virt_d_initrc_exec_t,s0)
/3pa/etc/libvirt/(.*)? -- gen_context(system_u:object_r:virt_etc_t,s0)
/3pa/etc/logrotate.d/(.*)? -- gen_context(system_u:object_r:etc_t,s0)

# should go into contrib/telnet.fc?
/usr/binos/sbin/in.telnetd -- gen_context(system_u:object_r:telnetd_exec_t,s0)

# load_crash_kernel.sh loads crash kernel - it should be executable
/crashkernel/load_crash_kernel.sh -- gen_context(system_u:object_r:bin_t,s0)

# /etc/lablogin.sh is executed during telnet login over management port
# it should be executable. Also having shell_exec_t label will allow it
# to transition into unconfined domain
/etc/lablogin.sh -- gen_context(system_u:object_r:shell_exec_t,s0)

# /etc/init.d/*functions files should be actually in bin_t domain, the same
# as /etc/init.d/functions. Note using /etc/rc\,d/init\,d/ instead of
# /etc/init\,d/ because we have substitution rule in file_contexts.subs_dist
/etc/rc\,d/init\,d/binos_functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\,d/init\,d/binos_functions-pd -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\,d/init\,d/chasxml_functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\,d/init\,d/common-utility-functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\,d/init\,d/rh-functions -- gen_context(system_u:object_r:bin_t,s0)

# tftp directories
/tftp -d gen_context(system_u:object_r:tftpd_dir_rw_t,s0)
/tftp/* gen_context(system_u:object_r:tftpd_dir_rw_t,s0)

# /tmp/sw
/tmp/sw -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/rp -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/fp -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/cc -d gen_context(system_u:object_r:tmp_t,s0)

```

```

# /tmp/etc
/tmp/etc -d gen_context(system_u:object_r:polaris_etc_t,s0)

# /tmp/sv
/tmp/sv -d gen_context(system_u:object_r:polaris_sv_tmp_t,s0)

# firmware files
/firmware(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
/upgrade(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
/golden(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
# CC card fpd files mark it as usr_t for now
/fpd(/.*)? -- gen_context(system_u:object_r:polaris_firmware_t,s0)

/tmp/debug\conf -l gen_context(system_u:object_r:polaris_debug_conf_t,s0)

/var/ODM/ios_core.p7b -- gen_context(system_u:object_r:etc_t,s0)

/dev/DDR -c gen_context(system_u:object_r:polaris_ddd_device_t,s0)
/dev/i2c-[0-9]* -c gen_context(system_u:object_r:polaris_i2c_device_t,s0)

(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/bin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/wbin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/lib(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/lib64(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/bin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/sbin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/lib(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/lib64(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/bin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/sbin(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/lib(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/lib64(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/opt/confd/lib/confd/lib/core/confd/priv(/.*)?\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)

# interpreter for CRDL 32bit IOSD setup proper memory map
/usr/binos/bin/crdl_mini_loader gen_context(system_u:object_r:ld_so_t,s0)

#firmware package mount point on asr1k platforms
/mnt/firmware(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)

/bootflash/.USWAP(/.*)? gen_context(system_u:object_r:polaris_uswap_files_t,s0)

#Nutella EFI folder
/bootflash/EFI(/.*)? gen_context(system_u:object_r:polaris_efi_files_t,s0)

```

```

#for cat9k platform
/mnt/sd3/user/.USWAP(/.*)? gen_context(system_u:object_r:polaris_uswap_files_t,s0)

/tmp/rsync_log_dir(/.*)? gen_context(system_u:object_r:polaris_rsync_tmp_t,s0)

#for wlc awips feature
/bootflash/awips.json gen_context(system_u:object_r:polaris_awips_signature_file_t,s0)

# for wlc iot-gw feature to access /bootflash/certs dir
/bootflash/certs -d gen_context(system_u:object_r:polaris_ap_cert_file_t,s0)

#for curl - and allowing ip netns exec X curl
/usr/bin/curl -- gen_context(system_u:object_r:polaris_curl_exec_t,s0)

# Katar WLC needs access to /tmp/ldwm_envelope
/tmp/ldwm_envelope -- gen_context(system_u:object_r:polaris_ldwm_envelope_tmp_t,s0)

# CLI: show platform software tech-support
/usr/binos/conf/platform_tech_support.sh -- gen_context(system_u:object_r:polaris_tech_support_exec_t,s0)

# Tamlib debug file
/bootflash/tamlib_dbg_log -- gen_context(system_u:object_r:polaris_tamlib_dbg_file_t,s0)

# cryptsetup - some platforms copy cryptsetup in /bin
/bin/cryptsetup -- gen_context(system_u:object_r:lvn_exec_t,s0)
/usr/bin/cryptsetup -- gen_context(system_u:object_r:lvn_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscommon.fc

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

define(`polaris\_process', `')dnl

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_process\_if.m4

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#

# March 2017, Victor Kamensky

#

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```

#

policy_module(polarisiptbl, 1.0);

#####
# iptbl.sh manual
#####

polaris_process_domain_template(iptbl)

corecmd_exec_bin(polaris_iptbl_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_iptbl_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_iptbl_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_iptbl_t)

# work with /tmp files
type polaris_iptbl_tmp_t;
files_tmp_file(polaris_iptbl_tmp_t)
manage_dirs_pattern(polaris_iptbl_t, tmp_t, polaris_iptbl_tmp_t)
manage_files_pattern(polaris_iptbl_t, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
manage_fifo_files_pattern(polaris_iptbl_t, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
files_tmp_filetrans(polaris_iptbl_t, polaris_iptbl_tmp_t, { file dir })

allow polaris_iptbl_t self:capability sys_resource;
allow polaris_iptbl_t self:process setpgid;

polaris_btrace_data_manage(polaris_iptbl_t)
polaris_cpld_read(polaris_iptbl_t)
polaris_chasfs_manage(polaris_iptbl_t)
polaris_boot_tmp_read(polaris_iptbl_t)
polaris_rmonbifo_tmp_read(polaris_iptbl_t)
polaris_proc_rmonbifo_getattr(polaris_iptbl_t)
polaris_proc_rmonbifo_read(polaris_iptbl_t)
polaris_disk_crashinfo_getattr(polaris_iptbl_t)

# execute /etc/init.d/iptables in its own domain
iptables_initrc_domtrans(polaris_iptbl_t)

# LOOK AT ME iptbl.sh puts symbolic links into /sbin directory
# need to fix manifest instead, so it will be static
gen_require(
    type bin_t;

```

```

')
manage_lnk_files_pattern(polaris_iptbl_t, bin_t, bin_t)

modutils_domtrans_insmod(polaris_iptbl_t)
iptables_domtrans(polaris_iptbl_t)

# iptbl.sh calls /etc/init.d/iptables restart and that needs
# read /proc/pid/net/ip_tables_names file
kernel_read_network_state(polaris_iptbl_t)
# creates /var/lock/subsys/iptables
type polaris_iptables_lock_t;
files_lock_file(polaris_iptables_lock_t)
manage_files_pattern(polaris_iptbl_t, polaris_iptables_lock_t, polaris_iptables_lock_t)
files_lock_filetrans(polaris_iptbl_t, polaris_iptables_lock_t, file)

# needs access to /run/netns as part of chvrf invocation
fs_read_nsfs_files(polaris_iptbl_t)
# iptbl.sh invokes iptable command which runs in iptables_t label and needs
# access to meta files created by iptbl.sh with label polaris_iptbl_tmp_t
allow iptables_t polaris_iptbl_tmp_t:fifo_file read_file_perms;
allow iptables_t polaris_iptbl_tmp_t:file read_file_perms;

# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
ifdef(`vwlc_platform',`
optional_policy(`
polaris_ncd_tmp_read(polaris_iptbl_t)
')
')

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiptbl.te
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```

```

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#

```

```

/usr/bin/bhytoolsd -- gen_context(system_u:object_r:polaris_bhytoolsd_exec_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.fc
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```

```

#
# March 2017, Victor Kamensky

```

```

#
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#

policy_module(polarisautoupgrade, 1.0);

gen_require(
    type polaris_autoupgrade_t;
)

corecmd_exec_bin(polaris_autoupgrade_t)
corecmd_exec_shell(polaris_autoupgrade_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_autoupgrade_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_autoupgrade_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_autoupgrade_t)

allow polaris_autoupgrade_t self:capability { sys_resource dac_override };
allow polaris_autoupgrade_t self:process setpgid;

polaris_tdldb_list_dirs(polaris_autoupgrade_t)

polaris_btrace_data_manage(polaris_autoupgrade_t)
polaris_chasfs_manage(polaris_autoupgrade_t)
polaris_cpld_read(polaris_autoupgrade_t)
polaris_proc_rmonbifo_read(polaris_autoupgrade_t)
polaris_rmonbifo_tmp_read(polaris_autoupgrade_t)
polaris_boot_tmp_manage(polaris_autoupgrade_t)
polaris_read_debug_conf(polaris_autoupgrade_t)
polaris_disk_crashinfo_getattr(polaris_autoupgrade_t)

type polaris_autoupgrade_tmp_t;
files_tmp_file(polaris_autoupgrade_tmp_t)
# /tmp/etc/installer
gen_require(
    type polaris_etc_t;
)
filetrans_pattern(polaris_autoupgrade_t, polaris_etc_t, polaris_autoupgrade_tmp_t, dir, "installer")
manage_fifo_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
manage_dirs_pattern(polaris_autoupgrade_t, polaris_etc_t, polaris_autoupgrade_tmp_t)
manage_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)

```

```

# Allow access to bootflash
polaris_bootflash_read(polaris_autoupgrade_t)

# Allow access to packages.conf
polaris_read_packages_conf(polaris_autoupgrade_t)

# needs to run pidof
dev_read_sysfs(polaris_autoupgrade_t)
kernel_read_system_state(polaris_autoupgrade_t)
domain_read_all_domains_state(polaris_autoupgrade_t)

# send syslog
logging_send_syslog_msg(polaris_autoupgrade_t)

# script starts rsync with mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_autoupgrade_t)
gen_require(
    type rsync_t;
)
allow rsync_t polaris_autoupgrade_t:process sigchld;

# /tmp/ufs/crashinfo access
optional_policy(
    polaris_ncd_tmp_read(polaris_autoupgrade_t)
)

# autoupgrade script in case of HA setup invokes breloy to trigger install of stand-by
polaris_bexecute_domtrans(polaris_autoupgrade_t)

polaris_flashlib_lock(polaris_autoupgrade_t)
polaris_flashlib_read(polaris_autoupgrade_t)
polaris_disk_install_read(polaris_autoupgrade_t)
polaris_install_engine_domtrans(polaris_autoupgrade_t)

#add transition to create /var/installer by autoupgrade
type polaris_autoupgrade_var_t;
files_tmp_file(polaris_autoupgrade_var_t)
files_var_filetrans(polaris_autoupgrade_t, polaris_autoupgrade_var_t, {file dir})
gen_require(
    type polaris_autoupgrade_exec_t;
)

#add transition to create /var/installer/auto_upgrade_helper.sh by autoupgrade
filetrans_pattern(polaris_autoupgrade_t,polaris_autoupgrade_var_t, polaris_autoupgrade_exec_t, file,
"auto_upgrade_helper.sh")
manage_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_var_t, polaris_autoupgrade_var_t)
manage_dirs_pattern(polaris_autoupgrade_t, polaris_autoupgrade_var_t, polaris_autoupgrade_var_t)

```

```

#add transition to create files/dir in /tmp
files_tmp_filetrans(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, {file dir})

# access to /tmp/installer
polaris_install_tmp_manage(polaris_autoupgrade_t)

fs_getattr_tmpfs(polaris_autoupgrade_t)

# access to /tmp/rsync_log_dir
polaris_manage_rsync_tmplog_dir(polaris_autoupgrade_t)

# access to /harddisk link (accessed by flashutil and rotee call)
polaris_disk_harddisk_read_lnk(polaris_autoupgrade_t)

rsync_entry_domtrans(polaris_chvrf_t, rsync_t)

gen_require(
    type polaris_autoupgrade_t;
    type polaris_autoupgrade_exec_t;
)
rsync_entry_domtrans(polaris_autoupgrade_t, rsync_t)
polaris_bexecute_domain(polaris_autoupgrade_t, polaris_autoupgrade_exec_t)

fs_getattr_xattr_fs(polaris_autoupgrade_t)

# auto_upgrade_helper.sh creates /var/installer/auto_upgrade_helper.sh
allow polaris_autoupgrade_t polaris_autoupgrade_exec_t:file { create setattr write };

# rsync operations for members and standby rps on autoupgrade
gen_require(
    type rsync_port_t;
)
allow polaris_autoupgrade_t rsync_port_t:tcp_socket name_connect;

# rsync requires to relabel /var/installer/auto_upgrade_helper.sh on standby
gen_require(
    type var_t;
)
allow rsync_t var_t:file relabelfrom;
allow rsync_t polaris_autoupgrade_exec_t:file relabelto;

# access to /vol/harddisk/*.pkg
polaris_getattr_file_harddisk(polaris_autoupgrade_t)

# access to /cdrom0/ when *ova image is booted during
# first instance of vwlc on ucs server
polaris_removable_read(polaris_autoupgrade_t)

```

```
polaris_getattr_file_harddisk(polaris_autoupgrade_t)
```

```
# auto_upgrade_client.sh access to "/tmp/sw/rp/0/0/rp_base/mount/bin/cut"
```

```
polaris_issu_tmp_files_read(polaris_autoupgrade_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.te
```

```
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```

```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/usr/binos/conf/run_ioxn_caf.sh -- gen_context(system_u:object_r:polaris_caf_exec_t,s0)
```

```
/usr/binos/conf/iox_reset.sh -- gen_context(system_u:object_r:polaris_caf_exec_t,s0)
```

```
ifdef(`nyquist_platform',`
```

```
/usr/binos/conf/standby_ioxcfg.sh -- gen_context(system_u:object_r:polaris_sioxcd_rp_exec_t,s0)
```

```
/tmp/app_host(/.*)? gen_context(system_u:object_r:polaris_sioxcd_rp_tmp_t,s0)
```

```
/mnt/sd3/iox_alt_hdd.dsk gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir(/.*)? gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir/iox(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir/caf(/.*)? gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/mnt/sd3/iox_alt_hdd_mount_dir/guest_share(/.*)?
```

```
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
```

```
/mnt/sd3/user/gscript/sss(/.*)? gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)
```

```
)
```

```
ifdef(`passport_platform',`
```

```
/flash1/iox_alt_hdd.dsk gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir(/.*)? gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir/iox(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir/caf(/.*)? gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
```

```
/flash1/iox_alt_hdd_mount_dir/guest_share(/.*)?
```

```
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
```

```
/flash1/user/gscript/sss(/.*)? gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)
```

```
/usr/binos/conf/standby_ioxcfg.sh gen_context(system_u:object_r:polaris_sioxcd_rp_exec_t,s0)
```

```
/tmp/app_host(/.*)? gen_context(system_u:object_r:polaris_sioxcd_rp_tmp_t,s0)
```

```
)
```

```
#All possible accesses from /bootflash/iox_alt_hdd_mount_dir (iox_polaris.conf)
```

```

/bootflash/iox_alt_hdd.dsk          gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir(/.*)?
gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox(/.*)?          gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/caf(/.*)?          gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)?
gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/guest_share(/.*)?
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/bootflash/user/gs_script/sss(/.*)?  gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)

#All the possible IOX guestshell_dir from iox_polaris.conf
/guestshell(/.*)?(.*)\.sh          gen_context(system_u:object_r:polaris_guestshell_exec_t,s0)
/guestshell(/.*)?                  gen_context(system_u:object_r:polaris_guestshell_t,s0)

#All the possible IOX flash_dir/harddisk_dir from iox_polaris.conf
/bootflash/iox(/.*)?                gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox(/.*)?                  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox(/.*)?                   gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox(/.*)?                  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox(/.*)?              gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/disk0/iox(/.*)?                 gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox(/.*)?                 gen_context(system_u:object_r:polaris_iox_files_t,s0)

/bootflash/iox_data_share(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_data_share(/.*)?         gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_data_share(/.*)?         gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox_data_share(/.*)?        gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox_data_share(/.*)?    gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/disk0/iox_data_share(/.*)?       gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox_data_share(/.*)?       gen_context(system_u:object_r:polaris_iox_files_t,s0)

/bootflash/iox_host_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_host_data_share(/.*)?    gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_host_data_share(/.*)?     gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox_host_data_share(/.*)?    gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/disk0/iox_host_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox_host_data_share(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)

/opt/cisco/caf/scripts(/.*)?(.*)\.sh  gen_context(system_u:object_r:polaris_caf_exec_t,s0)
/opt/cisco/caf(/.*)?(.*)              gen_context(system_u:object_r:polaris_caf_files_t,s0)
/opt/cisco/caf                        -d gen_context(system_u:object_r:polaris_caf_files_t,s0)

/var/log/caf(/.*)?                    gen_context(system_u:object_r:polaris_caf_log_t,s0)

/etc/guestshell_rsa_key\.pub          gen_context(system_u:object_r:polaris_guestshell_ssh_key_t,s0)

```

```

/etc/guestshell_rsa_key    gen_context(system_u:object_r:polaris_guestshell_ssh_key_t,s0)

/tmp/caf(/.*)?            gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/bootflash/caf(/.*)?     gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/mnt/sd3/caf(/.*)?      gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/flash1/caf(/.*)?       gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/flash11/caf(/.*)?      gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/harddisk/caf(/.*)? gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/disk0/caf(/.*)?    gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/usb1/caf(/.*)?     gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)

/var/run/netns/guestshell gen_context(system_u:object_r:polaris_guestshell_var_run_t,s0)
/var/run/cisco_cli(/.*)? gen_context(system_u:object_r:polaris_caf_var_run_t,s0)

/tmp/ttyF(/.*)(/.*)?    gen_context(system_u:object_r:fifo_var_run_t,s0)

```

# All the possible IOX bootflash/guest-share directory. This directory is shared between IOS and IOX

```

/bootflash/guest-share(/.*)?    gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/mnt/sd3/guest-share(/.*)?     gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/flash1/guest-share(/.*)?      gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/flash11/guest-share(/.*)?     gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/vol/harddisk/guest-share(/.*)? gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/vol/disk0/guest-share(/.*)?   gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/vol/usb1/guest-share(/.*)?    gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscaf.fc

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```

#
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#
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#

```

# polarisfnfagg file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.fc

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```

#

## <summary>Polaris cmm Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmm.if

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#

# polarisplogd file contexts place holder

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplogd.fc

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

divert(-1)

include(`polaris\_process.m4')

include(`polaris\_process\_if.m4')

include(`polaris\_ipc\_mqipc.m4')

include(`polaris\_ipc\_mqipc\_if.m4')

include(`polaris\_ipc\_ripc.m4')

include(`polaris\_ipc\_ripc\_if.m4')

include(`polaris\_ipc\_lipc.m4')

include(`polaris\_ipc\_lipc\_if.m4')

dnl Stub out non existent one

define(`polaris\_websocket\_service\_server',`')

define(`polaris\_cipc\_service\_server',`')

include(`polaris\_max\_scope.m4')

divert(0)dnl

```
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
## <summary>Polaris Platform IPC Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_if.m4
```

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```
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#
```

```
/tmp/.l.ndbutil-load gen_context(system_u:object_r:polaris_dmi_ndbutil_lock_t,s0)
/tmp/.l.ndbutil-use gen_context(system_u:object_r:polaris_dmi_ndbutil_lock_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.fc
```

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```
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#
```

```
/dev/cpp_vxe_rsrc -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_dev_info -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_kipc -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
```

# on 1ng box

```
/dev/octeon_device -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_pdma -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/i95_[0-9]* -c gen_context(system_u:object_r:polaris_i95_device_t,s0)
```

```
/dev/shm/cpp_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,cpp_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,CPP_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,CGM_SHM_SEM -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/cpp_ucose_dram -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/cpp_sbs_shm -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
```

```
/mnt/huge/cpp_ucose_dram -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
```

```
/tmp/cpp_ifdev_rep -p gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
/tmp/cpp_ifdev_req -p gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
/tmp/cpp_anon_db -- gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpp.fc

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```
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#
```

```
policy_module(polarisservicemgr, 1.0);
```

```
gen_require(
    type polaris_service_mgr_t;
)
```

```
polaris_btrace_data_manage(polaris_service_mgr_t)
polaris_crft_data_manage(polaris_service_mgr_t)
polaris_chasfs_manage(polaris_service_mgr_t)
polaris_cpld_read(polaris_service_mgr_t)
polaris_flashlib_read(polaris_service_mgr_t)
polaris_lua_read(polaris_service_mgr_t)
polaris_tdlresolve_read(polaris_service_mgr_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_service_mgr_t)
```

```
polaris_db_tldb_dir_use(polaris_service_mgr_t)
```

```
# Use REPM MQIPC for replication
polaris_repm_peer_mqipc_manage(polaris_service_mgr_t)
```

```
#watches of /tmp/[rp]fp[cc]/pvp/process_state directory
polaris_process_state_watch(polaris_service_mgr_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisservicemgr.te

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```
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```

```

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#

policy_module(polarispvp, 1.0);

polaris_process_domain_template(pvp)

# transition to pman domain, once pman is invoked by pvp
polaris_pman_domtrans(polaris_pvp_t)

corecmd_exec_bin(polaris_pvp_t)
corecmd_exec_shell(polaris_pvp_t)
# can execute hostname in pvp domain
hostname_exec(polaris_pvp_t)
# can execute process in polaris domain
polaris_exec(polaris_pvp_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_pvp_t)

# allow to get getattr of /proc file system during find over it
kernel_getattr_proc(polaris_pvp_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pvp_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_pvp_t)

# all to read sysctl files in /proc directory
kernel_read_all_sysctls(polaris_pvp_t)

# work with /tmp files
type polaris_pvp_tmp_t;
files_tmp_file(polaris_pvp_tmp_t)
manage_dirs_pattern(polaris_pvp_t, tmp_t, polaris_pvp_tmp_t)
manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
manage_fifo_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
files_tmp_filetrans(polaris_pvp_t, polaris_pvp_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_pvp_tmp_t, dir, "pvp")

# /tmp/silent_roll_select.log handling on Macallan
filetrans_pattern(domain, tmp_t, polaris_pvp_tmp_t, file, "silent_roll_select.log")

# work with /tmp/[rp|fp|cc]/pvp/process_state files
type polaris_process_state_t;
files_tmp_file(polaris_process_state_t)
manage_dirs_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t)

```

```

manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t)
filetrans_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t, dir, "process_state")

# LOOK AT ME now all polaris process can change each other process
# state. Need to fix it with more process specific labels in case
# when polaris_domain_process becomes template.
gen_require(
    attribute polaris_domain;
)
polaris_pvp_manage_process_state_files(polaris_domain)

allow polaris_pvp_t self:capability sys_resource;

# readlink access to /proc/<pid>/fd/0 triggers sys_ptrace capability need
allow polaris_pvp_t self:capability { sys_ptrace };

dmidecode_domtrans(polaris_pvp_t)

#on some ngwc pvp has to code-sign-verify silent roll packages
ifdef(^ngwc_family',`
polaris_code_verify_domtrans(polaris_pvp_t)
)

polaris_btrace_data_manage_all(polaris_pvp_t)
polaris_chasfs_manage(polaris_pvp_t)
polaris_cpld_read(polaris_pvp_t)
polaris_cpld_write(polaris_pvp_t)
polaris_proc_rmonbifo_read(polaris_pvp_t)
polaris_rmonbifo_tmp_read(polaris_pvp_t)
polaris_tdldb_list_dirs(polaris_pvp_t)
polaris_boot_tmp_read(polaris_pvp_t)
polaris_read_debug_conf(polaris_pvp_t)

# LOOK AT ME pvp.sh runs find over /proc. Needs access
# to state of all processes
domain_read_all_domains_state(polaris_pvp_t)

# pvp.sh can call logger command
logging_send_syslog_msg(polaris_pvp_t)

# should it not be moved to dmidecode module or better
# change script to call dmidecode with stdin redirected
# from /dev/null (i.e dmidecode < /dev/null)
gen_require(
    type dmidecode_t;
)
polaris_pvp_stdin_read(dmidecode_t)

```

```

# read pman tmp files
polaris_pman_read_tmp_files(polaris_pvp_t)

#allow polaris_pvp_t polaris_udev_tmp_files_t:dir { getattr search };
polaris_udev_tmp_list_dirs(polaris_pvp_t)

gen_require(
    type initrc_t;
    type init_t;
)
#init_script_tmp_filetrans(initrc_t, polaris_pvp_tmp_t, file, "iosd_memory_share")
files_tmp_filetrans({ initrc_t init_t }, polaris_pvp_tmp_t, file, "iosd_memory_share")

polaris_systemd_tmpfiles_tmp_filetrans(polaris_pvp_tmp_t, dir, "max_elastic_bays")

# direct access to serial TTY devices like /dev/ttyS1
term_write_unallocated_ttys(polaris_pvp_t)

# For Cabo, allow access to GNSS device
#ifdef(^cabo_platform',`
polaris_cabo_gnss_dev_use(polaris_pvp_t)
`)

# on ultra pvp calls hv_ttyprobe utility to figure out what terminal
# to use as console, and this one need read access to terminal. There is
# no separate macro for read only. But since we granting write to everyone
# let use 'use' which means read/write
#ifdef(^vxe_family',`
term_use_unallocated_ttys(polaris_pvp_t)
`)
#ifdef(^wlc_family',`
term_use_unallocated_ttys(polaris_pvp_t)
`)
# pvp's linux_iosd_image_env.sh will check /dev/ttyUSB* ports with hv_ttyprobe too.
term_use_usb_ttys(polaris_pvp_t)

# allow access and modify files in /tftp directory, cannot use tftp_manage_rw_content
# since it does not cover link files
gen_require(
    type tftpd_dir_rw_t;
)
manage_dirs_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
manage_files_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
manage_lnk_files_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)

# ASR1K modular platforms create /tftp/inv/inventory_${fru}_${slot}.bin
# /tftp/inv is not a softlink but a directory for asr1k Modular platforms.
# So it needs a file transition to polaris_chasfs_t for accessing it.

```

```

ifdef(`mcp_family',`
filetrans_pattern(domain, tftpd_dir_rw_t, polaris_chasfs_t, dir, "inv")
')
# on ultra platform hv_ttyprobe utility that runs under polaris_pvp_t label
# checks for existence of /boot/ttyS0_ignore file; and since /boot is symlink
# to /varied it need dir search permission over polaris_disk_varied_t
ifdef(`vxe_family',`
polaris_disk_varied_search(polaris_pvp_t)
')
ifdef(`wlc_family',`
polaris_disk_varied_search(polaris_pvp_t)
')

# pvp.sh calls cp utility with -a option that should preserve files
# attributes as result cp needs to perform set_process_security_ctx call
# which in turns calls setfscreatecon
allow polaris_pvp_t self:process setfscreate;

# pvp.sh calls pidof utility and it needs read access to sysfs_t
#
# When resetting a partner, pvp writes to the PCIe switch global
# reset register using the i2c driver, which is also sysfs_t
# LOOK AT ME should we create a new type for the PCIe switch reg
dev_rw_sysfs(polaris_pvp_t)

# wants to execute /bin/dmesg
dmesg_domtrans(polaris_pvp_t)

# wants to read from /tmp/rp/pvp/work/inot_fifo
gen_require(`
    type dmesg_t;
')
rw_fifo_files_pattern(dmesg_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)

# wants to write into /bootflash/.prst_sync
polaris_persistent_manage(polaris_pvp_t)

# pvp tried to find all execept hman polaris process with
# 'find /tmp/rp/process -name *.pid ! -name *hman* -printf %p' command
# should be able to read pman tmp files
polaris_pman_read_tmp_files(polaris_pvp_t)

# on way down pvp.sh call 'workon.sh rp 0 rotate force' so we
# need to transition and run it in btrace_rotate domain
polaris_btrace_rotate_domtrans(polaris_pvp_t)

# on way down pvp.sh checks for *.TEMP_IN_PROGRESS in /misc/scratch/core
# need to be able read /misc/scratch link

```

```

polaris_disk_bootflash_read_lnk(polaris_pvp_t)

# implode.sh things, should we run them in its own domain?

# removes /etc/exports, create a new empty one and runs 'exportfs -ua'
# this action also needs kernel_rw_rpc_sysctls to flush
files_manage_etc_files(polaris_pvp_t)
gen_require(
    type exports_t;
)
allow polaris_pvp_t exports_t:file delete_file_perms;
rpc_write_exports(polaris_pvp_t)
rpc_manage_nfs_state_data(polaris_pvp_t)
kernel_rw_rpc_sysctls(polaris_pvp_t)

# calls 'systemctl reboot'
systemd_start_power_services(polaris_pvp_t)

# pvp on lmg attempts to rm readonly fpd firmware file, not sure why
polaris_firmware_getattr(polaris_pvp_t)

# pvp reads /tmp/iosd_level
polaris_lm_tmp_read(polaris_pvp_t)
allow polaris_pvp_t self:capability dac_override;

# in some image pvp needs to monut /tmp/rp/tlddb, in other images
# it got mount by chasfs_boottime.sh systemd unit
polaris_tlddb_manage_dirs(polaris_pvp_t)
mount_domtrans(polaris_pvp_t)

# in some cases pvp script creates /tmp/xx/process directory
polaris_pman_tmp_filetrans(polaris_pvp_t, dir, "process")
polaris_pman_manage_tmp_files(polaris_pvp_t)

# on ngwc pvp creates /flash1/NVRAM directory
gen_require(
    type polaris_nvram_file_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "flash1")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)

# obtain access to rommon vars which live in flashlib
polaris_flashlib_read(polaris_pvp_t)
polaris_flashlib_write(polaris_pvp_t)

# on ngwc platforms pvp creates a /obfl_cc directory and soft links it
# to the correct vbd device

```

```

ifdef(`ngwc_family',`
gen_require(
    type polaris_obfl_data_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_obfl_data_t, dir, "obfl_cc")
)
# on ngwc platforms pvp needs to be able to determine if the the vbd devices
# exist. The types may be slightly different depending on whether the cc's
# device node is managed by udev or not
ifdef(`ngwc_family',`
dev_getattr_generic_blk_files(polaris_pvp_t)
storage_getattr_fixed_disk_dev(polaris_pvp_t)
udev_read_db(polaris_pvp_t)
)

# on ngwc platforms pvp soft links the /tmp/sw/cc_srdriver/<slot> directory
# to the correct silent roll software package via vbd_sr_app_init()
ifdef(`ngwc_family',`
polaris_sw_data_manage(polaris_pvp_t)
)

# on blackheart pvp creates /blackheart_config directory
ifdef(`blackheart_platform',`
gen_require(
    type polaris_nvram_file_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "blackheart_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
)

# on sparrow pvp creates /sparrow_config directory
ifdef(`sparrow_platform',`
gen_require(
    type polaris_nvram_file_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "sparrow_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
)

# on Aventus pvp creates /aventus_config directory
ifdef(`aventus_platform',`
gen_require(
    type polaris_nvram_file_t;
    type root_t;
)
)

```

```

filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "aventus_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
fs_manage_configfs_files(polaris_pvp_t)
')

# on utah for cc and on lng cyan_init.sh is executed by pvp
polaris_dyncfg_domtrans(polaris_pvp_t)
# should it not be moved to cyan module or better
# change script to call cyan_init.sh with stdin redirected
# from /dev/null (i.e cyan_init.sh < /dev/null)
gen_require(
    type polaris_dyncfg_t;
)
polaris_pvp_stdin_read(polaris_dyncfg_t)

# mktmpfd checks /tmp file system attributes
fs_getattr_tmpfs(polaris_pvp_t)

optional_policy(
# pvp on nyquist ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_pvp_t)
)

# transition to polaris_load_usbnet_t, once load_usbnet.sh is invoked by pvp
# crankshaft platforms need access to configfs
ifdef(^crankshaft_family,`
polaris_load_usbnet_domtrans(polaris_pvp_t)
gen_require(
    type configfs_t;
)
allow polaris_pvp_t configfs_t:dir getattr;
)

# runs rsync -ptgoDLq /bootflash/.installer/issu_crash/fru_crash rsync://rp0-0/bootflash/.installer/...
rsync_entry_type(polaris_pvp_t)

ifdef(^ngwc_family,`
polaris_chvrf_domtrans(polaris_pvp_t)
gen_require(
    type rsync_t;
)
allow rsync_t polaris_pvp_t:process sigchld;

# pvp_tmp file descriptor leaks into mcp_chvrf.sh
gen_require(
    type polaris_chvrf_t;
    type polaris_pvp_tmp_t;
)

```

```

allow polaris_chvrf_t polaris_pvp_tmp_t:fifo_file { ioctl read };
')

# statfs64 over /tmp
fs_getattr_xattr_fs(polaris_pvp_t)

polaris_tdlresolve_read(polaris_pvp_t)

corenet_tcp_connect_rsync_port(polaris_pvp_t)

#runs over /proc/<pid>/net/arp
kernel_read_network_state(polaris_pvp_t)

#runs over /proc/
kernel_read_network_state_symlinks(polaris_pvp_t)

# work with mounts
mount_domtrans(polaris_pvp_t)

optional_policy(`
# pvp.sh may mark or clear bits in /proc/exiting_bays
polaris_rw_exiting_bays(polaris_pvp_t)
')

optional_policy(`
container_runtime_domtrans(polaris_pvp_t)
')

# LOOK AT ME /usr/binos/conf/dockerd_env.sh not only sets environment
# it also does quite a bit of action in context of pvp when it got
# sourced before dockerd start
optional_policy(`
fs_getattr_all_fs(polaris_pvp_t)
files_getattr_all_dirs(polaris_pvp_t)
fs_read_nsfs_files(polaris_pvp_t)
container_manage_config_files(polaris_pvp_t)
polaris_caf_files_read(polaris_pvp_t)
# creates /var/log/docker/docker.log
logging_manage_generic_logs(polaris_pvp_t)
gen_require(`
    type var_log_t;
')
allow polaris_pvp_t var_log_t:dir create;
')

# support uswap feature.
# pvp script create and deletes
# the /bootflash./uswap/... folder.

```

```

type polaris_uswap_files_t;
files_type(polaris_uswap_files_t)
polaris_pfile_type(polaris_uswap_files_t)
filetrans_pattern(polaris_pvp_t, polaris_disk_bootflash_t, polaris_uswap_files_t, dir, ".USWAP")
manage_dirs_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)
manage_files_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)
manage_lnk_files_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)

# support for pvp to create /harddisk/.CRFT directory
filetrans_pattern(polaris_pvp_t, polaris_disk_bootflash_t, polaris_crft_data_t, dir, ".CRFT")

# Support SAI
type polaris_pvp_sai_t;
files_tmp_file(polaris_pvp_sai_t)
filetrans_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t, dir, "sai_process")
manage_dirs_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t)
manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t)
# all processes controlled by pchort require access to sai files
gen_require(
    attribute polaris_domain;
)
polaris_pvp_read_sai_files(polaris_domain)

ifdef(^ngwc_family';`
# ngmod_vbd_handle_mount@.service started by pvp on macallan
systemd_config_generic_services(polaris_pvp_t)
)

type polaris_pvp_var_run_t;
files_pid_file(polaris_pvp_var_run_t)
gen_require(
    type var_run_t;
)
manage_files_pattern(polaris_pvp_t, var_run_t, polaris_pvp_var_run_t)
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_rp")
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_fp")
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_cc")

# watch over /tmp/rp/pvp/control
allow polaris_pvp_t polaris_pvp_tmp_t:dir watch;

## permissions required during shutdown

# implode.sh 'systemctl reboot' uses dbus
dbus_system_bus_client(polaris_pvp_t)

# and checks reboot.target
systemd_status_power_services(polaris_pvp_t)

```

```

# writes sysctrl_i2c.lck file
gen_require(
    type polaris_cm_rp_tmp_t;
)
files_tmp_filetrans(polaris_pvp_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_pvp_t)

# journalctl and ifconfig are used when gathering logs during a punt-inject
# crash
journalctl_domtrans(polaris_pvp_t)
sysnet_domtrans_ifconfig(polaris_pvp_t)
# and allow it to write to our shutdownlog
gen_require(
    type ifconfig_t;
)
polaris_btrace_data_manage_all(ifconfig_t)

# implode.sh checks ip interfaces before ifconfig
polaris_socketat_nsfs_read(polaris_pvp_t)

# cedge uses logrotate
polaris_ripc_confd_ipc_connect(polaris_pvp_t)
# logrotate perms
polaris_confd_var_log_manage(polaris_pvp_t)
allow polaris_pvp_t self:capability { chown fowner };
# var_lib stuff
files_manage_urandom_seed(polaris_pvp_t)

# vconfd_script_admin_tech.sh is invoked by pvp.sh. This requires a domain
# transition from pvp to admin tech context.
polaris_admin_tech_domtrans(polaris_pvp_t)

## systemreport related permissions
# pd_info collection when triggering systemreport
# fdisk permissions
storage_raw_read_fixed_disk( polaris_pvp_t );
fstools_manage_entry_files( polaris_pvp_t);
fstools_exec( polaris_pvp_t );
polaris_rommon_device_read(polaris_pvp_t)
# dmesg writes to pd_info path
write_files_pattern(dmesg_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t )
gen_require(
    type admin_home_t;
)
# top creates/writes dir /.config
allow polaris_pvp_t admin_home_t:dir { add_name create write };

```

```
# drop-caches
kernel_rw_vm_sysctls( polaris_pvp_t );

# systemreport collection reads all sorts of files
# but also deletes those files afterwards...
logging_manage_audit_log(polaris_pvp_t)

# report collects maroon data
polaris_maroon_data_manage_all(polaris_pvp_t);
polaris_tdlresolve_manage(polaris_pvp_t);

# collect udev log
polaris_udev_tmp_manage(polaris_pvp_t)
```

```
init_status(polaris_pvp_t);
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispvp.te
```

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^ripc_stem', `translit(patsubst($1, `^-rip$', ``), `-', `_)')`
```

```
define(^ripc_label', `format(^polaris_%s_ripc_port_t', ripc_stem($1))')
```

dnl Ripc Type Map: track that type declations unique

```
define(^ripc_type_map', `defn(format(^`ripc_type_map[%s]', `$1'))')
```

```
define(^ripc_type_map_set', `define(format(^`ripc_type_map[%s]', `$1'), `$2)')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_rip.c.m4
```

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#

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#

```
policy_module(polarisquack, 1.0);
```

```
#####
```

```

# Quack Driver policy
#####

type polaris_quack_device_t;
dev_node(polaris_quack_device_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisquack.te
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#
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#

# Polaris lua files
/lu/(.*)?(.*)\.lua      -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
/usr/binos/conf/(.*)?(.*)\.lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
/lu/(.*)?(.*)\.so      -- gen_context(system_u:object_r:lib_t,s0)
/lu/(.*)?(.*)          -d gen_context(system_u:object_r:usr_t,s0)
/lu                    -d gen_context(system_u:object_r:usr_t,s0)

#Polaris nginx lua files
/var/scripts/lu/(.*)?    -d  gen_context(system_u:object_r:polaris_lua_file_t,s0)
/var/scripts/lu/(.*)?    --  gen_context(system_u:object_r:polaris_lua_file_t,s0)

# why did we put .so libraries in /var directory?
/var/LibLua/LuaXML_lib\,so  -- gen_context(system_u:object_r:lib_t,s0)
/var/LibLua/cjson\,so      -- gen_context(system_u:object_r:lib_t,s0)
/var/LibLua/(.*)\.lua      -- gen_context(system_u:object_r:polaris_lua_file_t,s0)

#/lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
/lu/(.*)? -- gen_context(system_u:object_r:polaris_lua_file_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislua.fc
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#
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#

```

```
/tmp/sw/cfg(/.*)? gen_context(system_u:object_r:polaris_cfg_data_t,s0)
/usr/bin/os/conf/cfg_sync.sh -- gen_context(system_u:object_r:polaris_cfg_sync_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscfg.fc
```

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```
#
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#
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#
```

```
/var/log/dmi(/.*)? gen_context(system_u:object_r:polaris_dmi_var_log_t,s0)
/tmp/stream-parsers(/.*)? gen_context(system_u:object_r:polaris_dmi_parser_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.fc
```

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```
#
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#
```

```
## <summary>Polaris container Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Creates types and rules for a basic
```

```
## polaris container process domain.
```

```
## </summary>
```

```
## <param name="stem">
```

```
## <summary>
```

```
## Stem for the domain. Name is constructed as polaris_stem_container_t
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
template(`polaris_container_domain_template`,`
```

```
gen_require(`
```

```
    type svirt_sandbox_file_t;
```

```
    type virt_lxc_var_run_t;
```

```
    attribute sandbox_net_domain;
```

```
    attribute svirt_sandbox_domain;
```

```
    bool virt_sandbox_use_sys_admin;
```

```

        bool virt_sandbox_use_mknod;
        bool virt_sandbox_use_all_caps;
        bool virt_sandbox_use_netlink;
    )

type polaris_$1_container_t, svirt_sandbox_domain;
domain_type(polaris_$1_container_t)
domain_user_exemption_target(polaris_$1_container_t)
mls_rangetrans_target(polaris_$1_container_t)
mcs_constrained(polaris_$1_container_t)
role system_r types polaris_$1_container_t;

logging_send_syslog_msg(polaris_$1_container_t)

kernel_read_system_state(polaris_$1_container_t)
kernel_read_all_proc(polaris_$1_container_t)

    virt_default_capabilities(polaris_$1_container_t)
    typeattribute polaris_$1_container_t sandbox_net_domain;
    dontaudit polaris_$1_container_t self:capability fsetid;
    dontaudit polaris_$1_container_t self:capability2 block_suspend ;
    allow polaris_$1_container_t self:process { execstack execmem };
    manage_chr_files_pattern(polaris_$1_container_t, svirt_sandbox_file_t, svirt_sandbox_file_t)
    kernel_load_module(polaris_$1_container_t)

    tunable_policy(`virt_sandbox_use_sys_admin`,`
        allow polaris_$1_container_t self:capability sys_admin;
    `)

    tunable_policy(`virt_sandbox_use_mknod`,`
        allow polaris_$1_container_t self:capability mknod;
    `)

    tunable_policy(`virt_sandbox_use_all_caps`,`
        allow polaris_$1_container_t self:capability all_capability_perms;
        allow polaris_$1_container_t self:capability2 all_capability2_perms;
    `)

    tunable_policy(`virt_sandbox_use_netlink`,`
        allow polaris_$1_container_t self:netlink_socket create_socket_perms;
        allow polaris_$1_container_t self:netlink_tcpdiag_socket create_netlink_socket_perms;
        allow polaris_$1_container_t self:netlink_kobject_uevent_socket create_socket_perms;
    `);
    logging_dontaudit_send_audit_msgs(polaris_$1_container_t)
)

allow polaris_$1_container_t virt_lxc_var_run_t:dir list_dir_perms;
allow polaris_$1_container_t virt_lxc_var_run_t:file read_file_perms;

```

```

kernel_read_irq_sysctls(polaris_${1}_container_t)
kernel_read_messages(polaris_${1}_container_t)

dev_read_sysfs(polaris_${1}_container_t)
dev_read_mtrr(polaris_${1}_container_t)
dev_read_rand(polaris_${1}_container_t)
dev_read_urand(polaris_${1}_container_t)

files_read_kernel_modules(polaris_${1}_container_t)

# Do we actually need these?
fs_mount_cgroup(polaris_${1}_container_t)
fs_manage_cgroup_dirs(polaris_${1}_container_t)
fs_manage_cgroup_files(polaris_${1}_container_t)
# Needed for docker
fs_unmount_xattr_fs(polaris_${1}_container_t)

auth_use_nsswitch(polaris_${1}_container_t)

optional_policy(`
rpm_read_db(polaris_${1}_container_t)
')

logging_send_syslog_msg(polaris_${1}_container_t)

tunable_policy(`virt_sandbox_use_audit`,`
    logging_send_audit_msgs(polaris_${1}_container_t)
')

userdom_use_user_ptys(polaris_${1}_container_t)

optional_policy(`
    # allow vman to kill lxc container process
    # on shutdown where vman destroys container-related
    # stuff after a timeout period
    polaris_vman_kill_process(polaris_${1}_container_t)
')

# copied from polariscommon.if. If the label is added in
# in permissive map, the below interface will make permissive
ifelse(permissive_domain(polaris_${1}_container_t), polaris_${1}_container_t,
`polaris_permissive_domain_setup(polaris_${1}_container_t),
    confined_domain(polaris_${1}_container_t), polaris_${1}_container_t, `,
    `polaris_domain_maybe_unconfined(polaris_${1}_container_t)')
)

```

```
#####
## <summary>
## Creates types and rules for a basic
## polaris KVM container process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_container_t
## </summary>
## </param>
#
template(`polaris_kvm_domain_template`,`
gen_require(`
    attribute virt_domain;
    type svirt_image_t;
`)

# for now, things are same as polaris_container_domain_template
polaris_container_domain_template($1

typeattribute polaris_$1_container_t virt_domain;
# allow {map} of svirt_image_t needed by VWAAAS similar to svirt
allow polaris_$1_container_t svirt_image_t:{ file blk_file } map;
)
#####
## <summary>
## Read Sandbox Files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sandbox_file_read`,`
gen_require(`
    type svirt_sandbox_file_t;
`)
read_files_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
read_lnk_files_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
list_dirs_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
)
#####
## <summary>
## Read Sandbox Files
## </summary>
## <param name="domain">
```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface('polaris_sandbox_file_dir_list',`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type svirt_sandbox_file_t;
    `)
    list_dirs_pattern($1, { svirt_sandbox_file_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
svirt_sandbox_file_t)
    optional_policy(`
        gen_require(`
            type polaris_iox_alt_hdd_files_t;
        `)
        list_dirs_pattern($1, polaris_iox_alt_hdd_files_t , svirt_sandbox_file_t)
    `)
)

#####
## <summary>
## Getattr of Sandbox Files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface('polaris_sandbox_file_getattr',`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type svirt_sandbox_file_t;
    `)
    getattr_files_pattern($1, { svirt_sandbox_file_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
svirt_sandbox_file_t)
    optional_policy(`
        gen_require(`
            type polaris_iox_alt_hdd_files_t;
        `)
        getattr_files_pattern($1, polaris_iox_alt_hdd_files_t, svirt_sandbox_file_t)
    `)
)
)

```

```
#####
## <summary>
##   Normal restricted permission to execute utd (snort) container
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_utd_container',`
    allow $1 self:netlink_generic_socket client_stream_socket_perms;
`)

```

```
#####
## <summary>
##   Allow domain transition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_container_domtrans',`
    gen_require(`
        type polaris_iox_container_t;
        type container_file_t;
    `)
    domain_transition_pattern($1, container_file_t, polaris_iox_container_t)
`)

```

```
#####
## <summary>
##   Allow watch on container files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_container_watch',`
    gen_require(`
        type tmpfs_t;
        type container_file_t;
    `)

```

```

    ')
    allow $1 container_file_t:{ dir file lnk_file} watch;
    allow $1 tmpfs_t:{ dir file lnk_file} watch;
    ')

#####
## <summary>
##   Send messages to utdl container unix datagram sockets.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_utdl_container_dgram_send`,`
    gen_require(`
        type polaris_utdl_container_t;
    `)
    allow $1 polaris_utdl_container_t:unix_dgram_socket sendto;
)

```

```

#####
## <summary>
##   Allow unix stream socket connect
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_waas_stream_connect`,`
    gen_require(`
        type polaris_waas_container_t;
    `)
    allow $1 polaris_waas_container_t:unix_stream_socket connectto;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscontainer.if

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```

#
# March 2017, Victor Kamensky
#
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```

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#

/tmp/\.flashlock -- gen\_context(system\_u:object\_r:polaris\_flashlib\_lock\_t,s0)

/tmp/flashdev.log -- gen\_context(system\_u:object\_r:polaris\_flashlib\_log\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisflashlib.fc

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#

# Oct 2020, Xin Xiang

#

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#

# dma map devices

/dev/dmammapp -c gen\_context(system\_u:object\_r:polaris\_dmammapp\_device\_t,s0)

# /dev/dma\_nw is introduced by Nightwatch switch module on ESG routing platform

/dev/dma\_nw -c gen\_context(system\_u:object\_r:polaris\_dmammapp\_device\_t,s0)

# dplr interrupt devices

/dev/dplr\_intrpt -c gen\_context(system\_u:object\_r:polaris\_dplr\_device\_t,s0)

# /dev/dplr\_nw is introduced by Nightwatch switch module on ESG routing platform

/dev/dplr\_nw -c gen\_context(system\_u:object\_r:polaris\_dplr\_device\_t,s0)

# e.g., /dev/msi/Slot8/Doppler0/Group0

/dev/msi/Slot[0-9]\*/Doppler[0-9]\* -c gen\_context(system\_u:object\_r:polaris\_dplr\_device\_t,s0)

/dev/msi/Slot[0-9]\*/Doppler[0-9]\*(/\*)? -c gen\_context(system\_u:object\_r:polaris\_dplr\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdoppler.fc

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris ncd Policy Rules.</summary>

#####

## <summary>

```

## Make the specified domain able to manage tmp file created by
## ncd.sh like /tmp/etc/ncd_work_dir
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ncd_tmp_manage`,`
    gen_require(`
        type polaris_ncd_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    manage_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    manage_lnk_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
`)

```

```
#####
```

```

## <summary>
## Make the specified domain able to read tmp file created by
## ncd.sh like /tmp/ufs/crashinfo
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ncd_tmp_read`,`
    gen_require(`
        type polaris_ncd_tmp_t;
    `)
    list_dirs_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    read_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    read_lnk_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
`)

```

```
#####
```

```

## <summary>
## Make the specified domain able to read etc file created by
## ncd.sh like /etc/conf/unifiedfs/mount_data
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>

```

```

#
interface(`polaris_ncd_etc_read`,`
    gen_require(`
        type polaris_ncd_etc_t;
    `)
    read_files_pattern($1, polaris_ncd_etc_t, polaris_ncd_etc_t)
`)

#####
## <summary>
##   Execute a domain transition to run ncd.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncd_domtrans`,`
    gen_require(`
        type polaris_ncd_t, polaris_ncd_exec_t;
    `)

    domtrans_pattern($1, polaris_ncd_exec_t, polaris_ncd_t)
`)

#####
## <summary>
##   Execute a domain transition to run unifiedfs_helper.sh.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ufs_helper_domtrans`,`
    gen_require(`
        type polaris_ufs_helper_t, polaris_ufs_helper_exec_t;
    `)

    domtrans_pattern($1, polaris_ufs_helper_exec_t, polaris_ufs_helper_t)
`)

#####
## <summary>
##   Run rpcinfo in a domain, grant proper network permissions.
## </summary>

```

```

## <param name="domain">
##   <summary>
##   Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncd_rpcinfo_net`,`
    corenet_tcp_bind_generic_node($1)
    corenet_tcp_bind_all_rpc_ports($1)
    corenet_tcp_connect_all_rpc_ports($1)
    corenet_tcp_connect_unreserved_ports($1)
    allow $1 self:tcp_socket { bind connect create getattr getopt setopt };

    corenet_udp_bind_generic_node($1)
    corenet_udp_bind_all_rpc_ports($1)
    allow $1 self:udp_socket { bind create getattr getopt setopt };

    corenet_tcp_connect_portmap_port($1)

ifdef(`passport_platform`,`
    # invoked rpcinfo which connects to port 2049 (nfs server)
    # port is incorrectly labelled due to falling in range of TDL define
    # of IOSd gold rpc service
    polaris_rpc_iosd_gold_connect($1)
)

ifdef(`starfleet_platform`,`
    # invoked rpcinfo which connects to port 2049 (nfs server)
    # port is incorrectly labelled due to falling in range of TDL define
    # of IOSd gold rpc service
    polaris_rpc_iosd_gold_connect($1)
)

ifdef(`bigbang_platform`,`
    #nfs server port 2049 is labelled as rpc-emd_ui_port_t based on TDL define
    polaris_rpc_emd_ui_connect($1)
)

)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisncd.if
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#
# July 2017, Victor Kamensky
#

```

```

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#

policy_module(polariscppcdm, 1.0);

gen_require(
    type polaris_cpp_cdm_t;
)

polaris_btrace_data_manage(polaris_cpp_cdm_t)
polaris_crft_data_manage(polaris_cpp_cdm_t)
polaris_chasfs_manage(polaris_cpp_cdm_t)
polaris_tdlresolve_read(polaris_cpp_cdm_t)
polaris_tdlldb_list_dirs(polaris_cpp_cdm_t)
polaris_cpld_read(polaris_cpp_cdm_t)
polaris_flashlib_read(polaris_cpp_cdm_t)

polaris_cpp_tmp_files_use(polaris_cpp_cdm_t)
# works with /dev/cpp_dev_info and /dev/cpp_kipc
polaris_cpp_dev_use(polaris_cpp_cdm_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_cpp_cdm_t)

polaris_icc_broken_relocations(polaris_cpp_cdm_t)

allow polaris_cpp_cdm_t self:capability net_admin;

# get attributes of /dev/shm from glibc where_is_shmfs function
fs_getattr_tmpfs(polaris_cpp_cdm_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_cdm_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_cdm_t)
)

# overlord/neptune access /sys/bus/pci/devices/0000:01:00.0/resource0
# when initializing the CPP DMAP library.
optional_policy(
polaris_cpp_cavium_dma_map(polaris_cpp_cdm_t)
)

optional_policy(
polaris_cbdma_dev_use(polaris_cpp_cdm_t)
)
polaris_cpld_dev_use(polaris_cpp_cdm_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcdm.te

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#

# August 2017, Victor Kamensky

#

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#

## <summary>Polaris bsm Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbsm.if

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#

# March 2017, Victor Kamensky

#

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#

/obfl -l gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

/obfl0 -l gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

/tmp/obfl(/.\*)? gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisobfl.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

/dev/cpld -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-ha -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-misc-int -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-virtual-fp -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-virtual-cc -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpld.fc

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dnl

dnl January 2021, Vaibhav Lade

dnl

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dnl

dnl VPCGW Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 0)

max\_bay\_map\_set(fp, `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_map\_set(cc, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_map\_set(fp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(rp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(cc, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(fp, `elastic', BPROC\_UEMGR, 7)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/vpcgwmaps.m4

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#

# July 2017, Victor Kamensky

#

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#

## <summary>Polaris gsd\_rp Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.if

No license file was found, but licenses were detected in source scan.

#

# January 2018, Manohar Hungund

#

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#

policy\_module(polarisocdplogrp, 1.0);

```

gen_require(
    type polaris_oct_dp_log_rp_t;
)

polaris_btrace_data_manage(polaris_oct_dp_log_rp_t)
polaris_chasfs_manage(polaris_oct_dp_log_rp_t)
polaris_tdlresolve_read(polaris_oct_dp_log_rp_t)
polaris_tdlldb_list_dirs(polaris_oct_dp_log_rp_t)
polaris_cpuld_read(polaris_oct_dp_log_rp_t)
polaris_flashlib_read(polaris_oct_dp_log_rp_t)

polaris_ripc_sman_ui_serv_connect(polaris_oct_dp_log_rp_t)

# direct access to serial TTY devices
# (octeon_dp_logger needs to acces /dev/ttyDASH7)
term_open_unallocated_ttys(polaris_oct_dp_log_rp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.te
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#
# June 2020, Manu Roy
#
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#

## <summary>Polaris iotswitch Policy Rules.</summary>
#
#
#####
## <summary>
##   Work (read, write, ioctl) with /dev/petra-fpga device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iots_fpga_dev_use',`
    gen_require(
        type device_t;
        type polaris_iots_fpga_device_t;
    )
    write_chr_files_pattern($1, device_t, polaris_iots_fpga_device_t)

```

```
    read_chr_files_pattern($1, device_t, polaris_iots_fpga_device_t)
    allow $1 polaris_iots_fpga_device_t:chr_file map;
')
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/tm
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_iots_tm_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_tm_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_tm_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_tm_device_t)
    allow $1 polaris_iots_tm_device_t:chr_file map;
')
```

```
#####
```

```
## <summary>
##   Allow access to semaphore with type polaris_cm_rp_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_cm_rp_sem_use`,`
    gen_require(`
        type polaris_cm_rp_t;
    `)
    allow $1 polaris_cm_rp_t:sem rw_sem_perms;
')
```

```
#####
```

```
## <summary>
##   Allow access to semaphore with type polaris_iots_mvDmaDrv_device_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##
```

```

## </summary>
## </param>
#
interface(`polaris_mvDmaDrv_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_mvDmaDrv_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_mvDmaDrv_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_mvDmaDrv_device_t)
    allow $1 polaris_iots_mvDmaDrv_device_t:chr_file map;
)

#####
## <summary>
## Allow access to semaphore with type polaris_iots_mvIntDrv_device_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_mvIntDrv_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_mvIntDrv_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_mvIntDrv_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_mvIntDrv_device_t)
)

#####
## <summary>
## Manage iots swipedrive files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_swipedrive_file_manage`,`
    gen_require(`
        type polaris_iots_swipedrive_file_t;
    `)
    manage_files_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
    manage_lnk_files_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
)

```

```
    manage_dirs_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
)
```

```
#####
```

```
## <summary>
##   Get the attributes of an swipe drive
##   filesystem.
## </summary>
```

```
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_getattr_swipedrive',`
    gen_require(`
        type polaris_iots_swipedrive_file_t;
    `)
)
```

```
    allow $1 polaris_iots_swipedrive_file_t:filesystem getattr;
)
```

```
#####
```

```
## <summary>
##   Allow access to semaphore with type polaris_iots_led_device_t
## </summary>
```

```
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_led_dev_use',`
    gen_require(`
        type device_t;
        type polaris_iots_led_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_led_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_led_device_t)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiotswitch.if

No license file was found, but licenses were detected in source scan.

```
#
# December 2019, Victor Kamensky
#
```

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#

## <summary>Polaris fnf\_agg Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.if

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris TDLResolve Policy Rules.</summary>

#####

# TDLresolve policy

#####

#####

## <summary>

## Open tdlresolve files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <rolebase/>

#

interface(`polaris\_tdlresolve\_read`,`

gen\_require(`

type polaris\_tdlresolve\_t;

`)

read\_files\_pattern(\$1, polaris\_tdlresolve\_t, polaris\_tdlresolve\_t)

read\_lnk\_files\_pattern(\$1, polaris\_tdlresolve\_t, polaris\_tdlresolve\_t)

list\_dirs\_pattern(\$1, polaris\_tdlresolve\_t, polaris\_tdlresolve\_t)

allow \$1 polaris\_tdlresolve\_t:file map;

gen\_require(`

type polaris\_global\_service\_t;

`)

read\_files\_pattern(\$1, polaris\_global\_service\_t, polaris\_global\_service\_t)

allow \$1 polaris\_global\_service\_t:file map;

`)

```
#####
## <summary>
##   Manage tdlresolve files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_tdlresolve_manage`,`
  gen_require(`
    type polaris_tdlresolve_t;
  `)
  manage_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  manage_lnk_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  manage_dirs_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  allow $1 polaris_tdlresolve_t:file map;
  gen_require(`
    type polaris_global_service_t;
  `)
  manage_files_pattern($1, polaris_global_service_t, polaris_global_service_t)
  allow $1 polaris_global_service_t:file map;
`)
```

```
#####
## <summary>
##   Watch tdlresolve directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_tdlresolve_watch`,`
  gen_require(`
    type polaris_tdlresolve_t;
  `)
  allow $1 polaris_tdlresolve_t:dir watch;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdlresolve.if

No license file was found, but licenses were detected in source scan.

```
#
# September 2018, Anubha Balani
#
# Copyright (c) 2018-2019 by Cisco Systems, Inc.
# All rights reserved
#

/tmp/maroon_stats -d gen_context(system_u:object_r:polaris_maroon_base_t,s0)
# zram devices
/dev/zram[0-9]*      -b gen_context(system_u:object_r:polaris_zram_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismemory.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# July 2020, Victor Kamensky
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarishtx, 1.0);
```

```
gen_require(
    type polaris_htx_t;
)
polaris_chasfs_read(polaris_htx_t)
polaris_cpld_read(polaris_htx_t)
polaris_tdlresolve_read(polaris_htx_t)

polaris_ripc_sman_ui_serv_connect(polaris_htx_t)
```

```
logging_send_syslog_msg(polaris_htx_t)
```

```
# LOOK AT ME uses shell and mkdir just to create /tmp/HTX-IOX directory
# should be single mkdir system call, in fact even this may not
# be needed since it is created by system-tempfiles
corecmd_exec_shell(polaris_htx_t)
corecmd_exec_bin(polaris_htx_t)
auth_use_nsswitch(polaris_htx_t)
```

```
# call posix_sysconf that opens /sys/devices/system/cpu/online
dev_read_sysfs(polaris_htx_t)
```

```
# create threads
```

```

allow polaris_htx_t self:process setsched;
allow polaris_htx_t self:capability sys_nice;

optional_policy(
    polaris_qfp_dgram_send(polaris_htx_t)
)

# vconfd_load_shared_schemas
polaris_conf_d_shared_schema_read(polaris_htx_t)

type polaris_htx_iox_tmp_t;
files_tmp_file(polaris_htx_iox_tmp_t)
polaris_htx_iox_tmp_manage(polaris_htx_t)

# htx logs files like /tmp/nwaas_log_sslproxy.log
type polaris_htx_tmp_t;
files_tmp_file(polaris_htx_tmp_t)
files_tmp_filetrans(polaris_htx_t, polaris_htx_tmp_t, file)
manage_files_pattern(polaris_htx_t, polaris_htx_tmp_t, polaris_htx_tmp_t)

# handle /dev/shm/tcpiproxy_debug_shm
type polaris_htx_tmpfs_t;
files_tmpfs_file(polaris_htx_tmpfs_t)
fs_tmpfs_filetrans(polaris_htx_t, polaris_htx_tmpfs_t, file)
fs_getattr_tmpfs(polaris_htx_t)
gen_require(^
    type tmpfs_t;
)
manage_files_pattern(polaris_htx_t, tmpfs_t, polaris_htx_tmpfs_t)
allow polaris_htx_t polaris_htx_tmpfs_t:file map;

# work with /tmp/memif
optional_policy(
    polaris_qfp_memif_manage(polaris_htx_t)
)

# sspi_memif
type polaris_sspi_memif_device_t;
dev_node(polaris_sspi_memif_device_t)
polaris_sspi_memif_dev_use(polaris_htx_t)

# packet_socket uinet_if_sspi_channel_init
allow polaris_htx_t self:packet_socket { create_socket_perms recv_msg send_msg};
allow polaris_htx_t self:capability net_raw;

# read and write /bootflash/cacert-ssl.pem
polaris_bootflash_manage(polaris_htx_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.te

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris nginx Policy Rules.</summary>

#####

## <summary>

## Allow domain to be started by nginx with

## transition into specific service domain.

## </summary>

## <param name="domain">

## <summary>

## Type to be used to run utility.

## </summary>

## </param>

## <param name="entry\_point">

## <summary>

## Type of the program to be used as an entry point to this domain.

## </summary>

## </param>

interface(`polaris\_nginx\_exec\_domain`,`

gen\_require(`

type polaris\_nginx\_t;

`)

domtrans\_pattern(polaris\_nginx\_t, \$2, \$1)

`)

#####

## <summary>

## Execute mcp\_trace\_filter script in its own domain.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed to transition.

## </summary>

## </param>

#

interface(`polaris\_trace\_filter\_domtrans`,`

```

gen_require(
    type polaris_trace_filter_t, polaris_trace_filter_exec_t;
)

domtrans_pattern($1, polaris_trace_filter_exec_t, polaris_trace_filter_t)
)

#####
## <summary>
##   Execute file transfer client in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_file_transfer_client_domtrans`,
    gen_require(
        type polaris_file_transfer_client_t, polaris_file_transfer_client_exec_t;
    )

    domtrans_pattern($1, polaris_file_transfer_client_exec_t, polaris_file_transfer_client_t)
)

#####
## <summary>
##   Allow others to perform pipe operations on nginx files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to perform the operation
##   </summary>
## </param>
#
interface(`polaris_nginx_manage_fifo_files`,
    gen_require(
        type polaris_nginx_t;
        type $1;
    )

    manage_fifo_files_pattern($1, polaris_nginx_t, polaris_nginx_t)
)

#####
## <summary>
##   Allow the specified domain to manage polaris_nginx_tmp_t files
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_nginx_tmp_manage`,`
    gen_require(`
        type polaris_nginx_tmp_t;
    `)

    manage_files_pattern($1, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
    files_tmp_filetrans($1, polaris_nginx_tmp_t, file, "ca.cert")
)

#####
## <summary>
## Manage polaris_fts_client_tmp_t in /tmp/fts_client.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_fts_client_tmp_manage`,`
    gen_require(`
        type polaris_fts_client_tmp_t;
    `)

    manage_files_pattern($1, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
    manage_dirs_pattern($1, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnginx.if

No license file was found, but licenses were detected in source scan.

```

#
# February 2020, Victor Kamensky
#
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# All rights reserved
#
## <summary>Polaris cedgetanman Policy Rules.</summary>

```

#####

```

## <summary>

```

```

## Read cedge tanman files and fifo_file. I.e
## /tmp/tan/tan_evt_fifo
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cedge_tanman_tmp_manage`,`
    gen_require(`
        type polaris_cedge_tanman_tmp_t;
    `)
    read_files_pattern($1, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
    read_fifo_files_pattern($1, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedge\_tanman.if

No license file was found, but licenses were detected in source scan.

```

#
# November 2017, Victor Kamensky
#
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#

```

```

# polarisgnmib file contexts place holder
/flash1/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)
/bootflash/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)
/mnt/sd3/user/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgnmib.fc

No license file was found, but licenses were detected in source scan.

```

#
# November 2020, Christine Hwang
#
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# All rights reserved
#

```

```

## <summary>Polaris bbu Policy Rules.</summary>

```

```

#####

```

```

## <summary>

```

```

## Work (read, write, ioctl) with /dev/ttyS2
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bbu_dev_use',`
    gen_require(`
        type device_t;
        type polaris_bbu_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_bbu_device_t)
    read_chr_files_pattern($1, device_t, polaris_bbu_device_t)
    allow $1 polaris_bbu_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbbu.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarisrollbacktimer Policy Rules.</summary>

#####
## <summary>
## Manage rbtimer file on bootflash (i.e /bootflash/.rollback_timer)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_rbtimer_bootflash_manage',`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_rbtimer_bootflash_t;
    `)
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_rbtimer_bootflash_t)
    manage_files_pattern($1, polaris_rbtimer_bootflash_t, polaris_rbtimer_bootflash_t)
)

```

```
filetrans_pattern($1, polaris_disk_bootflash_t, polaris_rbtimer_bootflash_t, dir, ".rollback_timer")
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris keyman Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariskeyman.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris polarisoom Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoom.if
```

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/usr/binos/conf/install_engine.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/install_assist.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/install_helper.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/sw_pload_svc.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/provision.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/issu_helper.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/issu/issu_check.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
/usr/binos/conf/packtool.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)
```

```

/usr/binos/conf/install_boottime.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)

/usr/bin/vconfd_script_upgrade\sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)

/usr/binos/conf/issu_client_comp.py -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)

/usr/binos/conf/install_selinux.sh -- gen_context(system_u:object_r:polaris_install_selinux_exec_t,s0)

/usr/binos/conf/install_show.sh -- gen_context(system_u:object_r:polaris_install_show_exec_t,s0)
/usr/binos/conf/install_issu_show.py -- gen_context(system_u:object_r:polaris_install_show_exec_t,s0)
/usr/bin/vconfd_script_show_installerfs.sh -- gen_context(system_u:object_r:polaris_install_show_exec_t,s0)

/usr/binos/conf/calcscha.sh -- gen_context(system_u:object_r:polaris_install_engine_exec_t,s0)

/usr/binos/conf/C9800-Wireless_startup_script.sh --
gen_context(system_u:object_r:polaris_install_wireless_exec_t,s0)
/usr/binos/conf/C9800-Wireless_stop_script.sh --
gen_context(system_u:object_r:polaris_install_wireless_exec_t,s0)

/bootflash/\.issu_loc_lock gen_context(system_u:object_r:polaris_issu_files_t,s0)
/tmp/issu(/.*)? gen_context(system_u:object_r:polaris_issu_tmp_files_t,s0)

/bootflash/.installer(/.*)? gen_context(system_u:object_r:polaris_disk_install_t,s0)
/bootflash/.images(/.*)? gen_context(system_u:object_r:polaris_install_images_t,s0)
/tmp/installer_tmplog(/.*)? gen_context(system_u:object_r:polaris_install_tmp_log_t,s0)
/tmp/installer(/.*)? gen_context(system_u:object_r:polaris_install_tmp_t,s0)
/bootflash/.sdwaninstaller(/.*)? gen_context(system_u:object_r:polaris_disk_install_t,s0)
/flash1/.sdwaninstaller(/.*)? gen_context(system_u:object_r:polaris_disk_install_t,s0)

/tmp/install_all_trans_log gen_context(system_u:object_r:polaris_install_tmp_t,s0)
/tmp/show_install_output.txt gen_context(system_u:object_r:polaris_install_show_tmp_t,s0)

/tmp/sw/rp(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/fp(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/cc(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/mount(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)

/tmp/patch gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/rp(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/fp(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/cc(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/smus(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)

# The following labels are specific to hot patch a SMUs shared objects
# using .so files). For cold patch files, the patch is subset of a package
# (it has the same structure) and therefore regular labeling rules will
# be in effect.
#

```

```

# The SMU hot patch directory hierarchy should look as follows:
#
# /RP.<ARCH>/<process>/patch(s)
# /FP.<ARCH>/<process>/patch(s)
# /CC.<ARCH>/<process>/patch(s)
#
/RP\[^\]/[^\]*(.*)?    gen_context(system_u:object_r:lib_t,s0)
/FP\[^\]/[^\]*(.*)?    gen_context(system_u:object_r:lib_t,s0)
/CP\[^\]/[^\]*(.*)?    gen_context(system_u:object_r:lib_t,s0)

# bundlee image/subpkg labeling
/packages.conf          -- gen_context(system_u:object_r:polaris_packages_conf_t,s0)
\.\pkginfo              -- gen_context(system_u:object_r:polaris_sw_data_t,s0)
/(.*)\.\pkg             -- gen_context(system_u:object_r:polaris_sw_data_t,s0)

/tmp/pkg_cs_debug/(.*)? gen_context(system_u:object_r:polaris_pkg_cs_debug_t,s0)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstall.fc
```

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

```

```
policy_module(polarisepcwsliaison, 1.0);
```

```

gen_require(
    type polaris_epc_ws_liaison_t;
)

```

```

polaris_btrace_data_manage(polaris_epc_ws_liaison_t)
polaris_crft_data_manage(polaris_epc_ws_liaison_t)
polaris_chasfs_manage(polaris_epc_ws_liaison_t)
polaris_tdlresolve_read(polaris_epc_ws_liaison_t)
polaris_tdlldb_list_dirs(polaris_epc_ws_liaison_t)
polaris_cpld_read(polaris_epc_ws_liaison_t)
polaris_flashlib_read(polaris_epc_ws_liaison_t)

```

```
polaris_rpc_sman_ui_serv_connect(polaris_epc_ws_liaison_t)
```

```
allow polaris_epc_ws_liaison_t self:capability { dac_override };
```

```
# tshark invoked by epc_ws_liaison needs to map /etc/passwd file.
```

```
auth_map_passwd(polaris_epc_ws_liaison_t)
```

```

# access to execute /sbin/tshark
corecmd_exec_bin(polaris_epc_ws_liaison_t)

# dumpcap needs access to net dir in sysfs
dev_read_sysfs(polaris_epc_ws_liaison_t)

# comm="dumpcap" kmod="net-pf-16-proto-12"
kernel_dontaudit_request_load_module(polaris_epc_ws_liaison_t)

# write pcap files to /bootflash
polaris_bootflash_manage(polaris_epc_ws_liaison_t)

# epc_ws_liaison and ngwc-fed pipe interaction
polaris_fed_shm_file_read(polaris_epc_ws_liaison_t)

# for pluggable FS, allow epc liaison to access files on them.
polaris_removable_manage(polaris_epc_ws_liaison_t)

# tshark and dumpcap runtime requirements
allow polaris_epc_ws_liaison_t self:capability { net_raw setgid setuid };
allow polaris_epc_ws_liaison_t self:netlink_netfilter_socket create;
allow polaris_epc_ws_liaison_t self:netlink_route_socket { bind create getattr nlmsg_read };
allow polaris_epc_ws_liaison_t self:packet_socket { bind create getopt ioctl map setopt };
allow polaris_epc_ws_liaison_t self:process setcap;
allow polaris_epc_ws_liaison_t self:unix_dgram_socket { create ioctl };
allow polaris_epc_ws_liaison_t self:udp_socket { create ioctl };

# /tmp/lsn.log and /tmp/epc_ws (WS_TMP_FOLDER)
type polaris_epc_ws_liaison_tmp_t;
files_tmp_file(polaris_epc_ws_liaison_tmp_t)
files_tmp_filetrans(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, { file dir })
manage_dirs_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
manage_files_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
manage_fifo_files_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t,
polaris_epc_ws_liaison_tmp_t)

#####
# CLI: show platform software wireshark show
#####
polaris_utility_domain_template(wireshark_show)
polaris_bexecute_domain(polaris_wireshark_show_t, polaris_wireshark_show_exec_t)

polaris_chasfs_manage(polaris_wireshark_show_t)
corecmd_exec_bin(polaris_wireshark_show_t)

# map /etc/passwd
auth_map_passwd(polaris_wireshark_show_t)

```

```

# open, read, getattr pcap files
polaris_bootflash_read(polaris_wireshark_show_t)

# write into pipe that smand created for us with popen
polaris_smand_use_fifo(polaris_wireshark_show_t)

corecmd_exec_shell(polaris_wireshark_show_t)

# sys file /sys/devices/system/cpu/online
dev_read_sysfs(polaris_wireshark_show_t)

# tshark and dumpcap runtime requirements
allow polaris_wireshark_show_t self:capability { setgid setuid net_admin };
allow polaris_wireshark_show_t self:netlink_netfilter_socket create;
allow polaris_wireshark_show_t self:netlink_route_socket { bind create getattr nlmsg_read };
allow polaris_wireshark_show_t self:process setcap;
allow polaris_wireshark_show_t self:udp_socket { create ioctl };
allow polaris_wireshark_show_t self:unix_dgram_socket { create ioctl };

#dumpcap needs access "/tmp/epc_ws/wif_to_ts_pipe" fifo file
polaris_epc_ws_liaison_fifo_read(polaris_wireshark_show_t)

# comm="dumpcap" kmod="net-pf-16-proto-12"
kernel_request_load_module(polaris_wireshark_show_t)

# /tmp/*.pcapng
type polaris_wireshark_show_tmp_t;
files_tmp_file(polaris_wireshark_show_tmp_t)
files_tmp_filetrans(polaris_wireshark_show_t, polaris_wireshark_show_tmp_t, file)
polaris_wireshark_show_tmp_manage(polaris_wireshark_show_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisepcwsliaison.te
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#
# June 2020 , Manu Roy
#
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#

policy_module(polarisiotswitch, 1.0);

# petra fpga device (/dev/petra-fpga)
type polaris_iots_fpga_device_t;
dev_node(polaris_iots_fpga_device_t)

```

```
# petra DMA ASIC driver (/dev/mvDmaDrv)
type polaris_iots_mvDmaDrv_device_t;
dev_node(polaris_iots_mvDmaDrv_device_t)
```

```
# petra Interrupt Asic driver (/dev/mvIntDrv)
type polaris_iots_mvIntDrv_device_t;
dev_node(polaris_iots_mvIntDrv_device_t)
```

```
# petra tm device (/dev/tm)
type polaris_iots_tm_device_t;
dev_node(polaris_iots_tm_device_t)
```

```
# petra tm device (/dev/mmcbk1p1)
type polaris_iots_swipedrive_device_t;
dev_node(polaris_iots_swipedrive_device_t)
```

```
type polaris_iots_swipedrive_file_t;
files_type(polaris_iots_swipedrive_file_t)
dev_associate(polaris_iots_swipedrive_file_t)
```

```
# LED device (/dev//dev/spidev0.0)
type polaris_iots_led_device_t;
dev_node(polaris_iots_led_device_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiotswitch.te

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris psd Policy Rules.</summary>

#####

## <summary>

## Read polaris\_restconf\_t files, effectively files

## under /tmp/restconf

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

```

## </param>
#
interface(`polaris_restconf_read`,`
    gen_require(`
        type polaris_restconf_t;
    `)
    read_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    read_lnk_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    list_dirs_pattern($1, polaris_restconf_t, polaris_restconf_t)
)

#####
## <summary>
##   Manage polaris_restconf_t files, effectively files
## under /tmp/restconf
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_restconf_manage`,`
    gen_require(`
        type polaris_restconf_t;
    `)
    manage_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    manage_lnk_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    manage_dirs_pattern($1, polaris_restconf_t, polaris_restconf_t)
)

#####
## <summary>
##   Manage polaris_ncsshd_keys_t files, effectively files
## under /tmp/.ncsshd_authorized_keys
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ncsshd_keys_manage`,`
    gen_require(`
        type polaris_ncsshd_keys_t;
    `)
    manage_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
    manage_lnk_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
)

```

```

    manage_dirs_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
)

#####
## <summary>
##   Read polaris_psd_tmp_t files, effectively access
## /tmp/dmi.ds_config created by psd and read by confd startup
## script
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_psd_tmp_read`,`
    gen_require(`
        type polaris_psd_tmp_t;
    `)
    read_files_pattern($1, polaris_psd_tmp_t, polaris_psd_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispsd.if  
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```

#
# March 2017, Victor Kamensky
#
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#

```

```

## <summary>Polaris smd Policy Rules.</summary>

```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissmd.if  
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```

dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
define(`polaris_process_aux_full`,`
polaris_process_domain_template($1)
`)

```

```
define(`polaris_process_aux',`
ifelse(process_type_map($1), `', `polaris_process_aux_full($1)')
process_type_map_set($1, 1)
')
```

```
define(`polaris_process',`
polaris_process_aux(process_stem($1))

')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_process\_te.m4

No license file was found, but licenses were detected in source scan.

```
#
# April 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarisdmincshdmgmt, 1.0);
```

```
gen_require(`
    type polaris_dmi_ncsshd_mgmt_t;
')
```

```
polaris_btrace_data_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_chasfs_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_tdlresolve_read(polaris_dmi_ncsshd_mgmt_t)
polaris_tdlldb_list_dirs(polaris_dmi_ncsshd_mgmt_t)
polaris_flashlib_read(polaris_dmi_ncsshd_mgmt_t)
```

```
corenet_tcp_bind_generic_node(polaris_dmi_ncsshd_mgmt_t)
allow polaris_dmi_ncsshd_mgmt_t self:tcp_socket { getattr getopt setopt bind create listen accept connect read write
};
allow polaris_dmi_ncsshd_mgmt_t self:udp_socket { getattr create connect read write };
allow polaris_dmi_ncsshd_mgmt_t self:cap_usersn { sys_admin net_bind_service };
```

```
type polaris_dmi_ncsshd_mgmt_var_run_t;
files_pid_file(polaris_dmi_ncsshd_mgmt_var_run_t)
manage_dirs_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t,
polaris_dmi_ncsshd_mgmt_var_run_t)
manage_files_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t,
polaris_dmi_ncsshd_mgmt_var_run_t)
files_pid_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t, { file dir })
```

```

# access /var/log/lastlog, /var/log/btmp
type polaris_dmi_ncsshd_mgmt_var_log_t;
logging_log_file(polaris_dmi_ncsshd_mgmt_var_log_t)
manage_files_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t,
polaris_dmi_ncsshd_mgmt_var_log_t)
logging_log_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t, file, "lastlog")
logging_log_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t, file, "btmp")

polaris_dmi_ncsshd_fwd_dgram_send(polaris_dmi_ncsshd_mgmt_t)

corenet_tcp_bind_polaris_dmi_ncsshd_mgmt_port(polaris_dmi_ncsshd_mgmt_t)
# ncsshd allows user-defined port with: netconf-yang ssh port <port_no>
corenet_tcp_bind_all_ports(polaris_dmi_ncsshd_mgmt_t)

auth_use_nsswitch(polaris_dmi_ncsshd_mgmt_t)
# assign following capabilities needed by sshd
allow polaris_dmi_ncsshd_mgmt_t self:capability { net_admin setgid sys_resource setuid sys_chroot kill };
allow polaris_dmi_ncsshd_mgmt_t self:process setrlimit;

# ncsshd requests pseudo terminal when netconf session is set up without
# explicitly specifying the subsystem name, such as netconf.
allow polaris_dmi_ncsshd_mgmt_t self:capability { chown fowner fsetid };
term_setattr_generic_ptys(polaris_dmi_ncsshd_mgmt_t)
term_getattr_pty_fs(polaris_dmi_ncsshd_mgmt_t)
term_use_generic_ptys(polaris_dmi_ncsshd_mgmt_t)
term_use_ptmx(polaris_dmi_ncsshd_mgmt_t)

#enable to read cpld file "/sys/devices/platform/cpld/board_vtype"
polaris_cpld_read(polaris_dmi_ncsshd_mgmt_t)
#for sshd needs access network interface resource
allow polaris_dmi_ncsshd_mgmt_t self:netlink_route_socket r_netlink_socket_perms;

# calls socketat server_listen at mgmt/dmi/ncsshd/src/sshd.c
polaris_socketat_nsfs_read(polaris_dmi_ncsshd_mgmt_t)
polaris_lfts_dev_use(polaris_dmi_ncsshd_mgmt_t)

corecmd_exec_bin(polaris_dmi_ncsshd_mgmt_t)

logging_send_syslog_msg(polaris_dmi_ncsshd_mgmt_t)
# TODO : revisit below statement when addressing initrc_exec_t denial
polaris_rmonbifo_tmp_read(polaris_dmi_ncsshd_mgmt_t)

# allow access to /tmp/sw/cfg and /tmp/sw/boot
polaris_boot_tmp_read(polaris_dmi_ncsshd_mgmt_t)
polaris_cfg_data_manage(polaris_dmi_ncsshd_mgmt_t)

polaris_dmi_dmiauthd_dgram_send(polaris_dmi_ncsshd_mgmt_t)

```

```

corenet_tcp_connect_polaris_netconf_interceptor_port(polaris_dmi_ncsshd_mgmt_t);
# This fixes runin.sh related denials. Refer to auth.c file which invokes bshell.
polaris_bexecute_domtrans(polaris_dmi_ncsshd_mgmt_t);

# This fixes authorized keys access related denials.
polaris_ncsshd_authorized_keys_read(polaris_dmi_ncsshd_mgmt_t);

# This fixes denials related to interceptor files.
polaris_interceptor_manage(polaris_dmi_ncsshd_mgmt_t);

# This fixes denials related to netconf_callhome executable
gen_require(
    type polaris_conf_d_t;
)
allow polaris_dmi_ncsshd_mgmt_t polaris_conf_d_t:tcp_socket { getattr getopt setopt };

# This fixes denials related to route, scp, chvrf command executables
# { read open getattr } operations are allowed on route command
# { search open } operations are allowed on scp command
# { read open execute execute_no_trans } operations are allowed on chvrf command
kernel_read_network_state(polaris_dmi_ncsshd_mgmt_t)

optional_policy(
# allows access to /tmp/xml/Intf dir and files
polaris_cedge_tmp_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_cedge_xml_tmp_manage(polaris_dmi_ncsshd_mgmt_t)
)
# This fixes denials related to ifconfig executable
# { execute read open execute_no_trans map getattr } operations are allowed
sysnet_domtrans_ifconfig(polaris_dmi_ncsshd_mgmt_t)

# This fixes access denials related to confd checking ncsshd_mgmt proc info
# /proc/<ncsshd pid>/
read_files_pattern(polaris_conf_d_t, polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_t)
read_lnk_files_pattern(polaris_conf_d_t, polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_t)

# allows access for admin-tech generation from vManage
polaris_admin_tech_data_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_bootflash_manage(polaris_dmi_ncsshd_mgmt_t)

# allow access to polaris_cfg_data_t
polaris_cfg_data_manage(polaris_dmi_ncsshd_mgmt_t)

# allow access to polaris_boot_tmp_t
polaris_boot_tmp_read(polaris_dmi_ncsshd_mgmt_t)

# allow to watch /var/run/netns and list dir
polaris_watch_netns(polaris_dmi_ncsshd_mgmt_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincshdmgmt.te

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```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarispman Policy Rules.</summary>
```

```
#####
## <summary>
##   Make the specified program domain accessible
##   from the pman.
## </summary>
## <param name="domain">
##   <summary>
##     The type of the process to transition to.
##   </summary>
## </param>
## <param name="entrypoint">
##   <summary>
##     The type of the file used as an entrypoint to this domain.
##   </summary>
## </param>
#
interface(`polaris_pman_entry`,`
    gen_require(`
        type polaris_pman_t;
        type polaris_gdb_t;
    `)

    domtrans_pattern(polaris_pman_t, $2, $1)
    domtrans_pattern(polaris_gdb_t, $2, $1)

    allow polaris_gdb_t $1:process { ptrace signal sigstop };
)`)
```

```
#####
## <summary>
##   Execute a domain transition to run pman.
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_pman_domtrans`,`
    gen_require(`
        type polaris_pman_t, polaris_pman_exec_t;
    `)

    domtrans_pattern($1, polaris_pman_exec_t, polaris_pman_t)
`)

#####
## <summary>
## Read pman temporary files and directories in /tmp.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pman_read_tmp_files`,`
    gen_require(`
        type polaris_pman_tmp_t;
    `)

    read_files_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
    list_dirs_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
`)

#####
## <summary>
## Manage pman temporary files and directories in /tmp.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pman_manage_tmp_files`,`
    gen_require(`
        type polaris_pman_tmp_t;
    `)

    manage_files_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
    manage_dirs_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
`)

```

```

)

#####
## <summary>
## Create an object in the polaris_pman_tmp directories.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_pman_tmp_filetrans`,`
gen_require(
type polaris_pman_tmp_t;
)

files_tmp_filetrans($1, polaris_pman_tmp_t, $2, $3)
)

#####
## <summary>
## Check existence (getattr) of pman btrace file (i.e
## polaris_pman_bt_t)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pman_bt_getattr`,`
gen_require(
type polaris_pman_bt_t;
type polaris_btrace_base_t;
)
getattr_files_pattern($1, polaris_btrace_base_t, polaris_pman_bt_t)
)

```

#####

```
## <summary>
##   Read and write to pmanlite fifo file, used as
##   stdout/stderr.
## </summary>
```

```
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_use_pman_fifo`,`
gen_require(`
type polaris_pman_t;
`)
```

```
allow $1 polaris_pman_t:fifo_file { rw_fifo_file_perms };
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispman.if

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```
#
# August 2017, Shawn Lu
#
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#
```

```
policy_module(polariswncmgrd, 1.0);
```

```
gen_require(`
type polaris_wncmgrd_t;
`)
```

```
polaris_btrace_data_manage(polaris_wncmgrd_t)
polaris_chasfs_manage(polaris_wncmgrd_t)
polaris_tdlresolve_read(polaris_wncmgrd_t)
polaris_tdlldb_list_dirs(polaris_wncmgrd_t)
polaris_cpld_read(polaris_wncmgrd_t)
polaris_lua_read(polaris_wncmgrd_t)
polaris_flashlib_read(polaris_wncmgrd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_wncmgrd_t)
```

```
polaris_db_tdlldb_dir_use(polaris_wncmgrd_t)
```

```

#allow setrlimit
allow polaris_wncmgrd_t self:process setrlimit;
allow polaris_wncmgrd_t self:capability sys_resource;
allow polaris_wncmgrd_t self:capability dac_override;

allow polaris_wncmgrd_t self:tcp_socket { shutdown };

#allow wncmgrd UDP socket operations
allow polaris_wncmgrd_t self:udp_socket { bind getattr setopt };
corenet_udp_bind_generic_node(polaris_wncmgrd_t)

#allow wncmgrd module to do ioctl,open,read,write operations on char file
polaris_lfts_dev_use(polaris_wncmgrd_t)

# it use tcp port 9090 and9091(polaris_wnc_mgrd_port)
corenet_tcp_bind_polaris_wnc_mgrd_port(polaris_wncmgrd_t)
#####
# For ewlc, wncd and wncmgrd needs access to files under /mnt/images/...these
# are related to AccessPoint images
#####
# wncmgrd calls ewlc_get_ap_sw_version() to open/read
#   /tmp/sw/rp/0/0/rp_wlc/mount/mnt/images/ap.pri/version.info
# call-chain: main -> ewlc_app_context_init -> wncd_evlib_app_init_cb ->
#   ewlc_capwapac_lib_init -> capwapac_init_default_config -> ewlc_get_ap_sw_version
polaris_wlc_ap_images_read(polaris_wncmgrd_t)

polaris_odm_clnt2svr_mqipc_create(polaris_wncmgrd_t)

polaris_tdlbpbersist_setup(polaris_wncmgrd_t)

polaris_tmp_tdlbpbersist_setup(polaris_wncmgrd_t)

logging_send_syslog_msg(polaris_wncmgrd_t)

# bind CAPWAP control and data
corenet_udp_bind_polaris_capwap_ctr_port(polaris_wncmgrd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wncmgrd_t)

# wncmgrd accessing NA certificate to push to AP
type polaris_icap_cert_t;
polaris_pfile_type(polaris_icap_cert_t)

#wncmgrd receives the certificate file from IOSd via IPC
#and writes to /bootflash for ICap feature
#and hence requires access.
gen_require(
type polaris_icap_cert_t;

```

```

')
filetrans_pattern(polaris_wncmgrd_t, polaris_disk_bootflash_t, polaris_icap_cert_t, file, "NACert.pem")
allow polaris_wncmgrd_t polaris_icap_cert_t:file { write create read open getattr unlink };

#allow tcp connection from http port for awips file download
#from DNAC
corenet_tcp_connect_http_port(polaris_wncmgrd_t)

#allow read/write/mmap access to awips file
gen_require(
type polaris_awips_signature_file_t;
)
filetrans_pattern(polaris_wncmgrd_t, polaris_disk_bootflash_t, polaris_awips_signature_file_t, file, "awips.json")
allow polaris_wncmgrd_t polaris_awips_signature_file_t:file { map write create read open getattr unlink };

#allow read access to resolv.conf
sysnet_read_config(polaris_wncmgrd_t)

#ewlc_capwap_dgram_srvr_create_raw_send_socket () creates a socket
#creates sll.sll_family = AF_PACKET;
#sll.sll_ifindex = dgram_io_desc->lfts_ifindex;
#sll.sll_protocol = htons(ETH_P_ALL);

allow polaris_wncmgrd_t self:packet_socket { create_socket_perms setopt };
allow polaris_wncmgrd_t self:rawip_socket { create_socket_perms setopt ioctl };

allow polaris_wncmgrd_t self:capability net_raw;
corenet_raw_bind_generic_node(polaris_wncmgrd_t)

gen_require(
type port_t;
)
allow polaris_wncmgrd_t port_t:rawip_socket name_bind;

# allow tmp symlinks
fs_read_tmpfs_symlinks(polaris_wncmgrd_t)
# allow tmp file read
polaris_install_tmp_read(polaris_wncmgrd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncmgrd.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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```

```

# All rights reserved
#

## <summary>Polaris NVRAM Policy Rules.</summary>

#####
# NVRAM policy
#####

#####
## <summary>
##   Manage nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_nvram_manage`,`
  gen_require(`
    type polaris_nvram_file_t;
    type device_t;
  `)

  manage_blk_files_pattern($1, device_t, polaris_nvram_file_t)
  manage_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
  manage_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)

#####
## <summary>
##   Read nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_nvram_read`,`
  gen_require(`
    type polaris_nvram_file_t;
    type device_t;
  `)
)

```

```
read_blk_files_pattern($1, device_t, polaris_nvram_file_t)
read_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
read_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)
```

```
#####
```

```
## <summary>
##   getattr for nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_nvram_getattr`,`
gen_require(`
type polaris_nvram_file_t;
type device_t;
)
```

```
getattr_blk_files_pattern($1, device_t, polaris_nvram_file_t)
getattr_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
getattr_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnvram.if

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```
#
# July 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/usr/cpp/bin/cpp_stats_svr -- gen_context(system_u:object_r:polaris_cpp_stats_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppstats.fc

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```
#
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#
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```

```

# All rights reserved
#

policy_module(polarisoom, 1.0);

polaris_process_domain_template(oom)

corecmd_exec_bin(polaris_oom_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_oom_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_oom_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_oom_t)

allow polaris_oom_t self:capability sys_resource;
allow polaris_oom_t self:process setpgid;

polaris_btrace_data_manage(polaris_oom_t)
polaris_chasfs_manage(polaris_oom_t)
polaris_cpld_read(polaris_oom_t)
polaris_boot_tmp_read(polaris_oom_t)
polaris_read_debug_conf(polaris_oom_t)
polaris_disk_crashinfo_getattr(polaris_oom_t)
polaris_rmonbifo_tmp_read(polaris_oom_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoom.te
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#
# March 2017, Victor Kamensky
#
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#

# /mnt/sd1 edison and nyquist
/mnt/sd1(/.*)?          gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/mnt/sd1/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd1/system-report_.*\tar\,gz  gen_context(system_u:object_r:polaris_system_report_t,s0)

# /mnt/sd3 edison and nyquist
/mnt/sd3(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/mnt/sd3/user/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)

```

```

/mnt/sd3/user/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd3/user/tan(/.*)?           gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd3/user/.ssh(/.*)?         gen_context(system_u:object_r:ssh_home_t,s0)
/mnt/sd3/user/.ssh/ssh_host.*_key\,pub gen_context(system_u:object_r:ssh_key_t,s0)
/mnt/sd3/user/.ssh/ssh_host.*_key  gen_context(system_u:object_r:ssh_key_t,s0)
/mnt/sd3/user/nvram_config --      gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/mnt/sd3/user/debug.conf --       gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/mnt/sd3/user/packages.conf       gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/mnt/sd3/user/.dbpersist(/.*)?    gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/mnt/sd3/user/.installer(/.*)?    gen_context(system_u:object_r:polaris_disk_install_t,s0)
/mnt/sd3/user/.rollback_timer(/.*)? gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/mnt/sd3/user/kernel/core(/.*)?   gen_context(system_u:object_r:polaris_core_file_t,s0)
/mnt/sd3/user/sys_report(/.*)?     gen_context(system_u:object_r:polaris_chasync_files_t,s0)

# /mnt/sd4 nyquist
/mnt/sd4(/.*)?                    gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /mnt/sd5 edison and nyquist
/mnt/sd5(/.*)?                    gen_context(system_u:object_r:polaris_disk_license_t,s0)

ifdef(`edison_platform',`
# /mnt/sd6
/mnt/sd6(/.*)?                    gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /mnt/sd7
/mnt/sd7(/.*)?                    gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /mnt/sd8
/mnt/sd8(/.*)?                    gen_context(system_u:object_r:polaris_disk_ucose_t,s0)

# /mnt/sd9
/mnt/sd9(/.*)?                    gen_context(system_u:object_r:polaris_disk_recovery_t,s0)
')

ifdef(`nyquist_platform',`
# /mnt/sd6
/mnt/sd6(/.*)?                    gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /mnt/sd7
/mnt/sd7(/.*)?                    gen_context(system_u:object_r:polaris_disk_ucose_t,s0)
#unmount script used ny Nyquist platform
/bin/cat9k_ssd_unmount.sh          gen_context(system_u:object_r:polaris_ssd_unmount_exec_t,s0)
')

ifdef(`quake_platform',`
# /mnt/sd6
/mnt/sd6(/.*)?                    gen_context(system_u:object_r:polaris_obfl_data_t,s0)

```

```

# /mnt/sd7
/mnt/sd7(/.*)?          gen_context(system_u:object_r:polaris_disk_ucode_t,s0)
')

# /crashinfo is symbolic link to /mnt/sd1 created by systemd-tmpfiles
/crashinfo              gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
# /flash is symbolic link to /mnt/sd3/user
/flash                  gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /lic0 is symbolic link to /mnt/sd4
/lic0                   gen_context(system_u:object_r:polaris_disk_license_t,s0)
# /lic1 is symbolic link to /mnt/sd5
/lic1                   gen_context(system_u:object_r:polaris_disk_license_t,s0)
# /ngwc_config/nvram is symbolic link to /mnt/sd3/user
/ngwc_config/nvram     gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# /flash1 macallan
/flash1(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/flash1/user/core(/.*)? gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/user/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/user/.ssh(/.*)? gen_context(system_u:object_r:ssh_home_t,s0)
/flash1/user/.ssh/ssh_host.*_key\*.pub gen_context(system_u:object_r:sshd_key_t,s0)
/flash1/user/.ssh/ssh_host.*_key   gen_context(system_u:object_r:sshd_key_t,s0)
/flash1/user/nvram_config --       gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/flash1/user/debug.conf --       gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/flash1/user/packages.conf       gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/flash1/user/kernel/core(/.*)?    gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/user/.rollback_timer(/.*)? gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/flash1/user/.installer(/.*)?     gen_context(system_u:object_r:polaris_disk_install_t,s0)
/flash1/user/.dbpersist(/.*)?     gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/flash1/user/tan(/.*)?           gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/user/sys_report(/.*)?     gen_context(system_u:object_r:polaris_chasync_files_t,s0)
/flash1/TEMPLATE(/.*)?          gen_context(system_u:object_r:polaris_chasync_files_t,s0)

# /flash2 macallan 9500h
/flash2(/.*)?          gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/flash2/CRASH(/.*)?    gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash2/CRASH/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)

# /flash3 macallan
/flash3(/.*)?          gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /flash4 macallan
/flash4(/.*)?          gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /flash5 macallan
/flash5(/.*)?          gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /flash6 macallan, used for silent roll in macallan

```

```

/flash6(/.*)?          gen_context(system_u:object_r:polaris_disk_ufcode_t,s0)

# /flash7 macallan, silent roll
/flash7(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# macallan silent roll link
/cc_sdrv                gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# macallan /ngmod_config/nvram link will be labeled by systemd-tmpfiles
/ngmod_config            gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/ngmod_config/nvram     gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# remap_mem0 device
/dev/remap_mem0 -c gen_context(system_u:object_r:polaris_remap_mem_device_t,s0)

# chdrvmmmap device (MMAP Driver for ASIC Memory mapping)
/dev/chdrvmmmap        -c gen_context(system_u:object_r:polaris_chdrvmmmap_device_t,s0)

# gettysburg_dev1 device
/dev/gettysburg_dev[0-9]* -c gen_context(system_u:object_r:polaris_gettysburg_fpga_device_t,s0)

# types that might be packages label by other policy
ifdef(`nyquist_platform',`
/usr/binos/bin/flash_check.sh -- gen_context(system_u:object_r:polaris_flashcheck_exec_t,s0)
/usr/binos/bin/cman_fp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cmcc -- gen_context(system_u:object_r:polaris_cm_cc_exec_t,s0)
`)
ifdef(`passport_platform',`
/usr/binos/bin/platform_mgr -- gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_exec_t,s0)
/usr/binos/bin/xcvr_test -- gen_context(system_u:object_r:polaris_xcvr_test_exec_t,s0)
/usr/binos/bin/sif_mgr -- gen_context(system_u:object_r:polaris_sif_mgr_exec_t,s0)
/usr/binos/bin/cmm -- gen_context(system_u:object_r:polaris_cmm_exec_t,s0)
/usr/binos/bin/bt_logger -- gen_context(system_u:object_r:polaris_bt_logger_exec_t,s0)
/usr/binos/bin/torchd -- gen_context(system_u:object_r:polaris_torch_exec_t,s0)
/usr/binos/bin/swift_sampled -- gen_context(system_u:object_r:polaris_faked_exec_t,s0)
`)

# PLEASE LOOK AT ME: why this file in /etc/init.d?
/etc/rc\.\d/init\.\d/cat9k_fpgahelper_funcs.sh -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\.\d/init\.\d/cat9k_kr_helper.sh -- gen_context(system_u:object_r:bin_t,s0)

# symbolic links in /platform-specific directory
/platform-specific/gryphon -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/gryphon_lite -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/prometheus -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/skyfox -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/vulcan -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/intrepid -l gen_context(system_u:object_r:root_t,s0)

```

```

/platform-specific/martion -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/farscape -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/borg -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/scorpion -l gen_context(system_u:object_r:root_t,s0)

# /dev/cisco/dplriomem device, Generic Memory map driver for mapping doppler IO memory to userspace
/dev/cisco/dplriomem -c gen_context(system_u:object_r:polaris_dplr_iomem_mmapdrv_device_t,s0)

/vol/disk0(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /appstore_hd is symbolic link to /vol/disk0
/appstore_hd -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /appstore_flash is symbolic link to /flash1
/appstore_flash -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /rp_srdrv is symbolic link to /flash6/DPU
/rp_srdrv -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /install is symbolic link to /flash1/INSTALL
/install -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# provide relabeling rules for /platform-specific/personality file
# otherwise, they cause conflicting specifications error during relabeling
/platform-specific/bigbang/lib/modules(/.*)?      gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/nyquist/lib/modules(/.*)?     gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/passport/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/starfleet/lib/modules(/.*)?   gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/intrepid/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/martion/lib/modules(/.*)?     gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/farscape/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/borg/lib/modules(/.*)?       gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/scorpion/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/imperial/lib/modules(/.*)?   gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/jura/lib/modules(/.*)?       gen_context(system_u:object_r:modules_object_t,s0)

/platform-specific/bigbang/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/nyquist/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/passport/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/starfleet/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/intrepid/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/martian/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/farscape/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/borg/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/scorpion/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/imperial/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/jura/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/quake1/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)

```

/platform-specific/quake2/lib/systemd/system(/.\*)? gen\_context(system\_u:object\_r:systemd\_unit\_file\_t,s0)

/platform-specific/bigbang/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/nyquist/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/passport/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/starfleet/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/intrepid/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/martian/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/farscape/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/borg/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/scorpion/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/imperial/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)  
/platform-specific/jura/usr/binos/conf(/.\*)? gen\_context(system\_u:object\_r:usr\_t,s0)

/platform-specific/bigbang/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/nyquist/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/passport/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/starfleet/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/intrepid/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/martian/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/farscape/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/borg/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/scorpion/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/imperial/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/jura/usr/binos/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)

/platform-specific/bigbang/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/nyquist/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/passport/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/starfleet/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/intrepid/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/martian/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/farscape/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/borg/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/scorpion/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/imperial/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)  
/platform-specific/jura/bin(/.\*)? gen\_context(system\_u:object\_r:bin\_t,s0)

/platform-specific/bigbang/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/nyquist/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/passport/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/starfleet/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/intrepid/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/martian/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/farscape/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/borg/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/scorpion/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)  
/platform-specific/imperial/etc/selinux(/.\*)? gen\_context(system\_u:object\_r:selinux\_config\_t,s0)

```

/platform-specific/jura/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/quake1/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/quake2/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)

# /objstore/.swtam for hybrid TAM access
/objstore(/.*)? gen_context(system_u:object_r:polaris_disk_objstore_t,s0)

/platform-specific/bigbang/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/nyquist/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/passport/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/starfleet/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/intrepid/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/martian/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/farscape/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/borg/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/scorpion/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/imperial/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/jura/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/quake1/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/quake2/etc/selinux(/^[^/]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)

/platform-specific/bigbang/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/nyquist/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/passport/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/starfleet/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/intrepid/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/martian/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/farscape/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/borg/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/scorpion/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/imperial/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/jura/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)

/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/bigbang/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/nyquist/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/passport/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/starfleet/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/intrepid/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/martian/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/farscape/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/borg/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/scorpion/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/imperial/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/jura/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)

```

```

/platform-specific/bigbang/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/nyquist/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/passport/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/starfleet/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/intrepid/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/martian/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/farscape/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/borg/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/scorpion/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/imperial/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/jura/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)

```

```

/dev/shm/sem\i2c_sem000 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem001 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem002 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem003 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem004 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem005 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem006 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem007 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\io_expander_semaphore gen_context(system_u:object_r:polaris_quake_i2c_t,s0)

```

# on pangea/bigbang platforms /dev/NVRAM block device is accessed

# by flashlib in iosd. It stores rommon vars

ifdef(`bigbang\_platform',`

```

/dev/NVRAM -b gen_context(system_u:object_r:polaris_flashlib_device_t)

```

# /mnt/sd6

```

/mnt/sd6(/.*)? gen_context(system_u:object_r:polaris_obfl_data_t,s0)

```

')

```

/vol/usb1(/.*)? gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

```

```

/mnt/vbd[a-j]2(/.*)? gen_context(system_u:object_r:polaris_obfl_data_t,s0)

```

```

/tmp/fpga_upgrade gen_context(system_u:object_r:polaris_fpga_upgrade_tmp_t,s0)

```

#/unicode0 9300 silent roll

```

/unicode0(/.*)? gen_context(system_u:object_r:polaris_disk_unicode0_t,s0)

```

#/dev/cisco/fpga\_iomem device, Generic Memory map driver for mapping FPGA IO memory to userspace

```

/dev/cisco/fpga_iomem -c gen_context(system_u:object_r:polaris_fpga_iomem_mmapfpga_device_t,s0)

```

# nplum-power file is located in /bootflash and needs to be accessed by cman-rp/IOSd

```

/flash1/user/nplum-power gen_context(system_u:object_r:polaris_nplum_power_file_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwc.fc

```

No license file was found, but licenses were detected in source scan.

```
#
# June 2020, Cuiyan Ma
#
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#

/usr/binos/conf/issu_comp_check.sh -- gen_context(system_u:object_r:polaris_issu_comp_check_exec_t,s0)
/tmp/boottime_comp_check_tree_other_rp -d gen_context(system_u:object_r:polaris_issu_comp_check_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#

## <summary>Polaris repm Policy Rules.</summary>
```

```
#####
## <summary>
##   Manage /tmp/replications files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_repm_tmp_manage`,`
    gen_require(`
        type polaris_repm_tmp_t;
    `)
    manage_files_pattern($1, polaris_repm_tmp_t, polaris_repm_tmp_t)
    manage_dirs_pattern($1, polaris_repm_tmp_t, polaris_repm_tmp_t)
`)
```

```
#####
## <summary>
##   Manage /dev/shm/mq.-repm_peer_mq/ files.
## </summary>
## <param name="domain">
```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_repm_peer_mqipc_manage`,
  gen_require(`
    type polaris_repm_peer_mqipc_t;
  `)
  manage_files_pattern($1, polaris_repm_peer_mqipc_t, polaris_repm_peer_mqipc_t)
  allow $1 polaris_repm_peer_mqipc_t:file map;
  polaris_mqipc_create_name_dir($1, polaris_repm_peer_mqipc_t, repm_peer_mq)
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrepm.if
No license file was found, but licenses were detected in source scan.

```

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl All rights reserved

dnl

```
define(`mqipc_interface_map', `defn(format(`mqipc_interface_map[%s]', ` $1'))')
```

```
define(`mqipc_interface_map_set', `define(format(`mqipc_interface_map[%s]', ` $1'), ` $2'))')
```

```
define(`polaris_mqipc_service_server_many',
```

```
  `ifelse($3, `',
```

```
    polaris_mqipc_create_name(dollarsone, $1, $2),
```

```
    polaris_mqipc_create_name(dollarsone, $1, $2-b$3)
```

```
  `ifelse($3, 0, `polaris_mqipc_create_name(dollarsone, $1, $2)', `polaris_mqipc_service_server_many($1, $2,
eval($3 - 1))')')
```

```
define(`polaris_mqipc_service_server_aux_full',`dnl
```

```
#####
```

```
## <summary>
```

```
## Create $2 mqipc chanell.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <infoflow type="none"/>
```

```
#
```

```
interface(`polaris_mqipc_$1_create_name`,`
```

```

gen_require(
    type $2;
)
$3
")

#####
## <summary>
## Use $2 mqipc chanell.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_mqipc_$1_use`,`
gen_require(
    type $2;
)

    polaris_mqipc_use(dollarsone, $2)
)
)

define(`polaris_mqipc_service_server_aux`,`
ifelse(mqipc_interface_map($1), ``, `polaris_mqipc_service_server_aux_full($1, $2, $3)`)
mqipc_interface_map_set($1, 1)
`)

define(`polaris_mqipc_service_server`,`dnl
polaris_mqipc_service_server_aux(mqipc_stem($1), mqipc_label($1),
    polaris_mqipc_service_server_many(mqipc_label($1), $5, max_scope_map($3, $4, $2)))')

define(`polaris_mqipc_service_client`,``)

define(`polaris_mqipc_service_server_elastic_client`,`dnl
polaris_mqipc_service_server_aux(mqipc_stem($1), mqipc_label($1),
    polaris_mqipc_service_server_many(mqipc_label($1), $5, max_scope_map($4, elastic, $3)))')

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_mqipc_if.m4
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#

```

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#

/dev/lsmapi -c gen\_context(system\_u:object\_r:polaris\_lsmapi\_device\_t,s0)

/dev/lsmapi\_app0 -c gen\_context(system\_u:object\_r:polaris\_lsmapi\_device\_t,s0)

/dev/lsmapi\_app1 -c gen\_context(system\_u:object\_r:polaris\_lsmapi\_device\_t,s0)

/dev/lsmapi\_app2 -c gen\_context(system\_u:object\_r:polaris\_lsmapi\_device\_t,s0)

/tmp/pi(/.\*)? gen\_context(system\_u:object\_r:polaris\_pi\_uds\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislsmapi.fc

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#

# November 2020, Christine Hwang

#

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# All rights reserved

#

policy\_module(polarisbbu, 1.0);

gen\_require(  
 type polaris\_bbu\_t;  
)

polaris\_btrace\_data\_manage(polaris\_bbu\_t)

polaris\_chasfs\_manage(polaris\_bbu\_t)

polaris\_tdlresolve\_read(polaris\_bbu\_t)

polaris\_cpld\_read(polaris\_bbu\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_bbu\_t)

# Allow I2C Usage

polaris\_i2c\_use(polaris\_bbu\_t)

polaris\_i2c\_sem\_manage(polaris\_bbu\_t)

# Allow sysfs read for platform ID

dev\_list\_sysfs(polaris\_bbu\_t)

# Allow bbu to access NVRAM for /flash0/bbu

fs\_getattr\_tmpfs(polaris\_bbu\_t)

polaris\_nvram\_manage(polaris\_bbu\_t)

# Allow logger which is used for syslog messages

allow polaris\_bbu\_t self:unix\_dgram\_socket { connect create };

```
logging_send_syslog_msg(polaris_bbu_t)
```

```
# tty BBU device  
type polaris_bbu_device_t;  
dev_node(polaris_bbu_device_t)
```

```
polaris_bbu_dev_use(polaris_bbu_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbbu.te
```

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```
#  
# February 2020, Victor Kamensky  
#  
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#
```

```
## <summary>Polaris dmi_ports_fetch Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Execute a domain transition to run dmi_ports_fetch.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed to transition.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_dmi_ports_fetch_domtrans`,`
```

```
gen_require(`
```

```
type polaris_dmi_ports_fetch_t, polaris_dmi_ports_fetch_exec_t;
```

```
`)
```

```
domtrans_pattern($1, polaris_dmi_ports_fetch_exec_t, polaris_dmi_ports_fetch_t)
```

```
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.if
```

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```
#  
# March 2017, Victor Kamensky  
#  
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```

```

#

policy_module(polariscliagent, 1.0);

gen_require(
    type polaris_cli_agent_t;
)

polaris_btrace_data_manage(polaris_cli_agent_t)
polaris_crft_data_manage(polaris_cli_agent_t)
polaris_chasfs_manage(polaris_cli_agent_t)
polaris_tdlresolve_read(polaris_cli_agent_t)
polaris_tdlldb_list_dirs(polaris_cli_agent_t)
polaris_cpld_read(polaris_cli_agent_t)
polaris_flashlib_read(polaris_cli_agent_t)

polaris_rpc_sman_ui_serv_connect(polaris_cli_agent_t)

polaris_db_tdlldb_dir_use(polaris_cli_agent_t)

polaris_libeiutil_build_config_directory(polaris_cli_agent_t)

# cli_agent /var/run pid file
type polaris_cli_agent_var_run_t;
files_pid_file(polaris_cli_agent_var_run_t)
manage_files_pattern(polaris_cli_agent_t, polaris_cli_agent_var_run_t, polaris_cli_agent_var_run_t)
manage_dirs_pattern(polaris_cli_agent_t, polaris_cli_agent_var_run_t, polaris_cli_agent_var_run_t)
files_pid_filetrans(polaris_cli_agent_t, polaris_cli_agent_var_run_t, { file dir })

polaris_cfg_data_manage(polaris_cli_agent_t)

# Provide sys_resource capability as well for sys_pipe calls
allow polaris_cli_agent_t self:capability { dac_override sys_resource };

logging_send_syslog_msg(polaris_cli_agent_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_cli_agent_t)
polaris_tmp_tdlldb_persist_setup(polaris_cli_agent_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscliagent.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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```

```

# All rights reserved
#

policy_module(polarisflashlib, 1.0);

#####
# Flashlib policy (infra/flashlib)
#####
type polaris_flashlib_lock_t;
files_type(polaris_flashlib_lock_t)

gen_require(
    attribute polaris_extended_domain;
)

# /tmp/.flashlock file is used as flashlib lock
gen_require(
    type init_t;
)
files_tmp_filetrans({ init_t polaris_extended_domain }, polaris_flashlib_lock_t, file, ".flashlock")

type polaris_flashlib_log_t;
files_type(polaris_flashlib_log_t)

gen_require(
    attribute polaris_extended_domain;
)

# /tmp/flashdev.log file is used as flashlib to log
files_tmp_filetrans(polaris_extended_domain, polaris_flashlib_log_t, file, "flashdev.log")

# /dev/shm/flash_shm shared memory
type polaris_flash_shm_t;
files_type(polaris_flash_shm_t)

gen_require(
    attribute polaris_domain;
    type tmpfs_t;
)
filetrans_pattern(polaris_domain, tmpfs_t, polaris_flash_shm_t, file, "flash_shm")

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashlib.te
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#
# July 2017, Victor Kamensky
#

```

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#

## <summary>Polaris CPLD Policy Rules.</summary>

#####

# Quack Driver policy

#####

#####

## <summary>

## Work (read, write, ioctl) with /dev/quack

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_quack\_dev\_use`,`

gen\_require(`

type device\_t;

type polaris\_quack\_device\_t;

`)

write\_chr\_files\_pattern(\$1, device\_t, polaris\_quack\_device\_t)

read\_chr\_files\_pattern(\$1, device\_t, polaris\_quack\_device\_t)

`)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisquack.if

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#

# October 2017, Victor Kamensky

#

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#

## <summary>Polaris wstatsd Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswstatsd.if

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dnl

dnl Mar 2020, Manu Roy

```
dnl
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dnl
dnl Petra Platform Max Bay Limits
max_bay_map_set(`rp', `per_bay', 0)
max_bay_map_set(`cc', `per_bay', 0)
max_bay_map_set(`fp', `per_bay', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/petramaps.m4
```

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```
#
# October 2017, Victor Kamensky
#
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#
```

```
policy_module(polariswstatsd, 1.0);
```

```
gen_require(
    type polaris_wstatsd_t;
)
```

```
polaris_btrace_data_manage(polaris_wstatsd_t)
polaris_crft_data_manage(polaris_wstatsd_t)
polaris_chasfs_manage(polaris_wstatsd_t)
polaris_tdlresolve_read(polaris_wstatsd_t)
polaris_tdlldb_list_dirs(polaris_wstatsd_t)
polaris_cpld_read(polaris_wstatsd_t)
polaris_lua_read(polaris_wstatsd_t)
polaris_flashlib_read(polaris_wstatsd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_wstatsd_t)
```

```
polaris_db_tdlldb_dir_use(polaris_wstatsd_t)
```

```
allow polaris_wstatsd_t self:capability dac_override;
allow polaris_wstatsd_t self:udp_socket { bind setopt getattr };
corenet_udp_bind_generic_node(polaris_wstatsd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wstatsd_t)
polaris_socketat_nsfs_read(polaris_wstatsd_t)
polaris_lfts_dev_use(polaris_wstatsd_t)
```

```
polaris_tdlldbpersist_setup(polaris_wstatsd_t)
```

```

polaris_tmp_tdlldb_persist_setup(polaris_wstatsd_t)

logging_send_syslog_msg(polaris_wstatsd_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_wstatsd_t)

#this is being given for process to execute tar
corecmd_exec_bin(polaris_wstatsd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswstatsd.te
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#
# December 2019, Victor Kamensky
#
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#

policy_module(polarisfnfagg, 1.0);

gen_require(
    type polaris_fnf_agg_t;
)

polaris_btrace_data_manage(polaris_fnf_agg_t)
polaris_crft_data_manage(polaris_fnf_agg_t)
polaris_chasfs_read(polaris_fnf_agg_t)
polaris_tdlresolve_read(polaris_fnf_agg_t)
polaris_lua_read(polaris_fnf_agg_t)
polaris_flashlib_read(polaris_fnf_agg_t)
polaris_cpld_read(polaris_fnf_agg_t)

polaris_ripc_sman_ui_serv_connect(polaris_fnf_agg_t)

polaris_db_tdlldb_dir_use(polaris_fnf_agg_t)

allow polaris_fnf_agg_t self:capability { dac_override dac_read_search };

type polaris_fnf_agg_tmp_t;
files_tmp_file(polaris_fnf_agg_tmp_t)
files_tmp_filetrans(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, dir, "fnf_agg")
manage_files_pattern(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, polaris_fnf_agg_tmp_t)
manage_dirs_pattern(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, polaris_fnf_agg_tmp_t)

# allow sending files over HTTP

```

```

corenet_tcp_connect_http_port(polaris_fnf_agg_t)
sysnet_read_config(polaris_fnf_agg_t)

# allow UDP connection for punting fnf records
allow polaris_fnf_agg_t self:udp_socket { create_socket_perms recv_msg };
corenet_udp_bind_generic_node(polaris_fnf_agg_t)

# allow punting on routers/ewlc where lfts is being used
polaris_lfts_dev_use(polaris_fnf_agg_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.te
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#
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#
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#

## <summary>Polaris VXE Platform Policy Rules.</summary>

interface(`polaris_objstore_sem_use`,`
    gen_require(`
        type polaris_objstore_sem_t;
    `)
    allow $1 polaris_objstore_sem_t:sem rw_sem_perms;
    mmap_files_pattern($1, polaris_objstore_sem_t, polaris_objstore_sem_t)
    manage_files_pattern($1, polaris_objstore_sem_t, polaris_objstore_sem_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/vda1 device
## </summary>
## <param name="domain">
##     <summary>
##         Domain allowed access.
##     </summary>
## </param>
#
interface(`polaris_grub_efi_use`,`
    gen_require(`
    type polaris_grub_efi_t;
    `)
    write_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
    read_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)

```

)

#####

## <summary>

## Search /dev/vda1 device the efi partition

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_grub\_efi\_search',`

gen\_require(`

type polaris\_grub\_efi\_t;

')

search\_dirs\_pattern(\$1, polaris\_grub\_efi\_t, polaris\_grub\_efi\_t)

')

#####

## <summary>

## Read VXE install info files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_vxeinstall\_info\_read',`

gen\_require(`

type polaris\_vxeinstall\_info\_t;

')

read\_files\_pattern(\$1, polaris\_vxeinstall\_info\_t, polaris\_vxeinstall\_info\_t)

list\_dirs\_pattern(\$1, polaris\_vxeinstall\_info\_t, polaris\_vxeinstall\_info\_t)

')

#####

## <summary>

## Read /dev/vda1 device the efi partition

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_grub\_info\_read',`

```

gen_require(
type polaris_grubver_t;
type polaris_grub_bios_t;
type polaris_grub_efi_t;
)
read_files_pattern($1, polaris_grubver_t, polaris_grubver_t)
read_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
read_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
list_dirs_pattern($1, polaris_grubver_t, polaris_grubver_t)
list_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
list_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
)

#####
## <summary>
## Manage /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_grubcfg_manage',`
gen_require(
type polaris_grub_bios_t;
type polaris_grub_efi_t;
)
manage_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
manage_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
manage_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
manage_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
)

#####
## <summary>
## Manage regular files/directories under /varied/grub
## CSR manages files in legacy grub disk location
## also allow run readlink -f /dev/bootflash
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_legacy_grub_manage',`
gen_require(

```

```

type boot_t;
type fixed_disk_device_t;
')
manage_files_pattern($1, boot_t, boot_t)
manage_dirs_pattern($1, boot_t, boot_t)
storage_getattr_fixed_disk_dev($1)
')

#####
## <summary>
##   Work (read, write, ioctl) with /dev/hanet
##   hanet driver used by vpcgw platform of VXE family
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
ifdef(`vpcgw_platform',`
interface(`polaris_hanet_dev_use',`
gen_require(`
    type device_t;
    type polaris_hanet_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_hanet_device_t)
    read_chr_files_pattern($1, device_t, polaris_hanet_device_t)
)
)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvxe.if
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#
# March 2017, Victor Kamensky
#
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#

/usr/binos/conf/pman.sh -- gen_context(system_u:object_r:polaris_pman_exec_t,s0)
/usr/bin/pman          -- gen_context(system_u:object_r:polaris_pman_exec_t,s0)
/bin/gdbserver        -- gen_context(system_u:object_r:polaris_gdb_exec_t,s0)
/usr/bin/gdbserver     -- gen_context(system_u:object_r:polaris_gdb_exec_t,s0)
/tmp/pman_ports(/.*)?  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

/tmp/fp/process(/.*)?  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

```

```
/tmp/rp/process(/.*)? gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

/tmp/vxe_ucose_image gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/wlc_ucose_image gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/utah_ucose_image gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/fugazi_ucose_image gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispman.fc
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```

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

dnl Macallan Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
```

```
max_bay_map_set(cc, `per_bay', 9)
```

```
max_bay_map_set(fp, `per_bay', 9)
```

```
min_bay_ripc_map_set(rp, `per_bay', 0)
```

```
min_bay_ripc_map_set(cc, `per_bay', 1)
```

```
min_bay_ripc_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `per_bay', 2)
```

```
max_bay_ripc_map_set(cc, `per_bay', 10)
```

```
max_bay_ripc_map_set(fp, `per_bay', 1)
```

```
min_bay_ripc_map_set(rp, `global', 0)
```

```
min_bay_ripc_map_set(cc, `global', 1)
```

```
min_bay_ripc_map_set(fp, `global', 0)
```

```
max_bay_ripc_map_set(rp, `global', 2)
```

```
max_bay_ripc_map_set(cc, `global', 10)
```

```
max_bay_ripc_map_set(fp, `global', 1)
```

dnl in elastic scope each process has its own value

```
max_elastic_map_set(rp, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(fp, `elasitic', BPROC_ODM, 0)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/macallanmaps.m4
```

```
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```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisissustack, 1.0);
```

```
gen_require(`
```

```
    type polaris_issu_stack_t;
```

```
`)
```

```
corecmd_exec_bin(polaris_issu_stack_t)
```

```
corecmd_exec_shell(polaris_issu_stack_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
```

```
libs_exec_ld_so(polaris_issu_stack_t)
```

```
# allow read of /etc/group and /etc/passwd
```

```
auth_use_nsswitch(polaris_issu_stack_t)
```

```
# allow to read /proc/meminfo
```

```
kernel_read_system_state(polaris_issu_stack_t)
```

```
# work with /tmp files (/tmp/issu_stk)
```

```
type polaris_issu_stack_tmp_t;
```

```
files_tmp_file(polaris_issu_stack_tmp_t)
```

```
manage_dirs_pattern(polaris_issu_stack_t, tmp_t, polaris_issu_stack_tmp_t)
```

```
manage_files_pattern(polaris_issu_stack_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
```

```
manage_fifo_files_pattern(polaris_issu_stack_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
```

```
files_tmp_filetrans(polaris_issu_stack_t, polaris_issu_stack_tmp_t, file)
```

```
files_tmp_filetrans(polaris_issu_stack_t, polaris_issu_stack_tmp_t, dir, "issu_stk")
```

```
allow polaris_issu_stack_t self:capability sys_resource;
```

```
polaris_btrace_data_manage(polaris_issu_stack_t)
```

```
polaris_chasfs_manage(polaris_issu_stack_t)
```

```
polaris_cpld_read(polaris_issu_stack_t)
```

```
polaris_proc_rmonbifo_read(polaris_issu_stack_t)
```

```
polaris_rmonbifo_tmp_read(polaris_issu_stack_t)
```

```
polaris_boot_tmp_read(polaris_issu_stack_t)
```

```
polaris_tdlresolve_read(polaris_issu_stack_t)
```

```
polaris_disk_crashinfo_getattr(polaris_issu_stack_t)
```

```

allow polaris_issu_stack_t self:capability dac_override;

polaris_read_debug_conf(polaris_issu_stack_t)

polaris_flashlib_read(polaris_issu_stack_t)

allow polaris_issu_stack_t self:process setpgid;

# modify tdlresolve epoch
polaris_tdlresolve_manage(polaris_issu_stack_t)

#rsync_exec(polaris_issu_stack_t)
gen_require(^
    type rsync_t;
)
rsync_entry_domtrans(polaris_issu_stack_t, rsync_t)
allow rsync_t polaris_issu_stack_t:process sigchld;

# execute rsync over over eobc: /usr/binos/conf/mcp_chvrf.sh eobc rsync
polaris_chvrf_domtrans(polaris_issu_stack_t)
# from chvrf.sh code executes rsync command
gen_require(^
    type polaris_chvrf_t;
)
rsync_entry_domtrans(polaris_chvrf_t, rsync_t)
# LOOK AT ME: issu_stack.sh leaks fd of /tmp/issu_stk/chassis_state_evt_fifo
# for now grant access, since changing script may not be trivial
manage_fifo_files_pattern(polaris_chvrf_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
write_files_pattern(polaris_chvrf_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)

polaris_install_engine_domtrans(polaris_issu_stack_t)
# LOOK AT ME: isse_stack.sh leak fd of /tmp/issu_stk/chassis_state_evt_fifo
# for now grant access, since changing script may not be trivial
gen_require(^
    type polaris_install_engine_t;
)
read_fifo_files_pattern(polaris_install_engine_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)

polaris_install_tmp_read(polaris_issu_stack_t)

# access /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_issu_stack_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_issu_stack_t)

# reads /tmp/remote_sw_verinfo.txt

```

```

gen_require(
    type rsync_tmp_t;
)
read_files_pattern(polaris_issu_stack_t, rsync_tmp_t, rsync_tmp_t)

# watch over /tmp/tdlresolve/work
polaris_tdlresolve_watch(polaris_issu_stack_t)

#issu_stack.sh access to epoch_merge.lua,epoch_endpoint_update.lua
polaris_lua_read(polaris_issu_stack_t)

#issu_stack.sh access to /tmp/rsync_log_dir
polaris_manage_rsync_tmplog_dir(polaris_issu_stack_t)

#issu_stack.sh access to epoch_merge.lua which merges epoch files, local.epoch and inyterchassis/.epoch file
#luajit/usr/bin/os/conf/epoch_merge.lua--base-file/tmp/tdlresolve/epoch_dir/local.epoch
#--merge-file/tmp/tdlresolve/work/inter
allow polaris_issu_stack_t self:process execmem;

#access to /tmp/installer/
polaris_install_tmp_manage(polaris_issu_stack_t)

#access to /tmp/ufs/harddisk
polaris_ncd_tmp_read(polaris_issu_stack_t)

# use of errmsg.sh
polaris_script_errmsg_use(polaris_issu_stack_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissustack.te
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarislsmpi, 1.0);

#####
# Polaris lsmpi
#####

type polaris_lsmpi_device_t;
dev_node(polaris_lsmpi_device_t)

```

```
# note polaris_sysfs_contdev_t is defined in kernel/devices.te, since genfscon statements
# could be only in base policy
```

```
# punt/inject working through unix domain sockets
type polaris_pi_uds_t;
files_tmp_file(polaris_pi_uds_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislsmpi.te
No license file was found, but licenses were detected in source scan.
```

```
#
# May 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris mdt_pubd Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarisemd, 1.0);
```

```
gen_require(
    type polaris_emd_t;
)
```

```
polaris_btrace_data_manage(polaris_emd_t)
polaris_crft_data_manage(polaris_emd_t)
polaris_chasfs_manage(polaris_emd_t)
polaris_tdlresolve_read(polaris_emd_t)
polaris_tdlldb_list_dirs(polaris_emd_t)
polaris_cpld_read(polaris_emd_t)
polaris_flashlib_read(polaris_emd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_emd_t)
```

```
polaris_cpld_dev_use(polaris_emd_t)
```

```

dev_read_sysfs(polaris_emd_t)
polaris_obfl_data_manage(polaris_emd_t)
polaris_persistent_read(polaris_emd_t)

allow polaris_emd_t self:capability dac_override;

ifdef(`mcp_family',`
polaris_scooby_dev_use(polaris_emd_t)
# read/write /sys/bus/i2c/drivers/pca9544/2-0077/reg_control and others
dev_getattr_sysfs_fs(polaris_emd_t)
dev_rw_sysfs(polaris_emd_t)
')

logging_send_syslog_msg(polaris_emd_t)

ifdef(`qwlc_platform',`
# on qwlc read eeprom through i2c like /sys/devices/i2c-12/12-0050/eeprom
dev_rw_sysfs(polaris_emd_t)
dev_getattr_sysfs_fs(polaris_emd_t)
')

#sparrow needs access to /dev/i2c*
ifdef(`sparrow_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
')
polaris_i2c_use(polaris_emd_t)
polaris_i2c_sem_manage(polaris_emd_t)
mmap_files_pattern(polaris_emd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
')

ifdef(`katar_platform',`
dev_rw_sysfs(polaris_emd_t)
dev_getattr_sysfs_fs(polaris_emd_t)
')

# emd creates udp socket
allow polaris_emd_t self:udp_socket create_socket_perms;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisemd.te

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```

#
# March 2017, Victor Kamensky
#
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```

```

#

## <summary>Polaris polarisdroputil Policy Rules.</summary>

#####
## <summary>
##   Manage droputils temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_droputil_manage_tmp_files`,`
    gen_require(`
        type polaris_droputil_tmp_t;
    `)

    manage_files_pattern($1, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
    read_in_files_pattern($1, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
)

```

```

#####
## <summary>
##   Watch droputil_tmp directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_droputil_tmp_watch`,`
    gen_require(`
        type polaris_droputil_tmp_t;
    `)

    allow $1 polaris_droputil_tmp_t:dir watch;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdroputil.if

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```

#
# March 2017, Victor Kamensky
#

```

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#

/tmp/iosd\_level -- gen\_context(system\_u:object\_r:polaris\_lm\_tmp\_t,s0)

/tmp/stack\_apcount -- gen\_context(system\_u:object\_r:polaris\_lm\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarism.fc

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

define(^polaris\_ripc\_service\_server,`')

define(^polaris\_ripc\_service\_client,`')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_ripc\_if.m4

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_ripc\_fc.m4

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dnl

dnl December 2018, Victor Kamensky

dnl

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dnl

dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(^rp, `per\_bay', 0)

max\_bay\_map\_set(^cc, `per\_bay', 0)

max\_bay\_map\_set(^fp, `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(^rp, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(^cc, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(^fp, `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(^rp, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(^cc, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(^fp, `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/quake1maps.m4

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```
#
# Sep 2020, Sridhar C
#
# Copyright (c) 2020-2021 by Cisco Systems, Inc.
# All rights reserved
#

policy_module(polaristlscd, 1.0);

gen_require(
    type polaris_tlscd_t;
    type net_conf_t;
)

polaris_btrace_data_manage(polaris_tlscd_t)
polaris_chasfs_manage(polaris_tlscd_t)
polaris_tdlresolve_read(polaris_tlscd_t)
polaris_tdlldb_list_dirs(polaris_tlscd_t)
polaris_lua_read(polaris_tlscd_t)
polaris_flashlib_read(polaris_tlscd_t)
polaris_chasfs_read(polaris_tlscd_t)
polaris_cpld_read(polaris_tlscd_t)
polaris_db_tdlldb_dir_use(polaris_tlscd_t)

# Related to vrf support of the socket
polaris_lfts_dev_use(polaris_tlscd_t)
polaris_socketat_nsfs_read(polaris_tlscd_t)
polaris_vrf_shm_manage(polaris_tlscd_t)

# TLSCd reads TCP/UDP ports open in VRF_GLOBAL for packet forwarding
# to IOSd or BinOS applications.
kernel_read_net_sysctls(polaris_tlscd_t)
kernel_read_network_state(polaris_tlscd_t)
kernel_search_network_sysctl(polaris_tlscd_t)
allow polaris_tlscd_t net_conf_t:dir search;
allow polaris_tlscd_t net_conf_t:file { getattr open read watch };

# UDS related sockets are:
# /tmp/tlscd/iosd_to_tlscd_0_socket
# /tmp/tlscd/tlscd_to_iosd_0_socket
# IOSd and TLSCd exchange packet over these UDS socket, allow create/bind
type polaris_tlscd_uds_t;
files_tmp_file(polaris_tlscd_uds_t)
polaris_tlscd_uds_manage(polaris_tlscd_t)
polaris_iosd_dgram_send(polaris_tlscd_t)
allow polaris_tlscd_t self:unix_dgram_socket { bind create };
```

```
# Tunnel and TLS TCP connection related related
corenet_rw_tun_tap_dev(polaris_tlscd_t)
allow polaris_tlscd_t self:tun_socket create;
corenet_tcp_connect_all_ports(polaris_tlscd_t)
```

```
# errmsg
logging_send_syslog_msg(polaris_tlscd_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristlscd.te
```

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^polaris_database_aux',`dnl
```

```
type $1;
```

```
polaris_tdlldb_type($1)
```

```
')
```

```
define(^polaris_database',`dnl
```

```
polaris_database_aux(database_label($1))
```

```
')
```

```
define(^polaris_database_process_aux_full',`dnl
```

```
gen_require(`
```

```
    type $2;
```

```
")
```

```
polaris_db_tdlldb_$1_use($2)
```

```
')
```

```
define(^polaris_database_process_aux',`dnl
```

```
ifelse(database_use_map($1, $2), `', `polaris_database_process_aux_full($1, $2)')
```

```
database_use_map_set($1, $2, 1)
```

```
')
```

```
define(^polaris_database_process',`dnl
```

```
polaris_database_process_aux(database_stem($1), process_label($2))dnl
```

```
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_db_te.m4
```

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```
#
# January 2021, Gabriel Lee, Shawn Liu
#
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#

## <summary>Polaris ezmanage Policy Rules.</summary>

#####
## <summary>
## Transition to ezmanage
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_ezmanage_domtrans`,`
gen_require(`
type polaris_ezmanage_t, polaris_ezmanage_exec_t;
`)

domtrans_pattern($1, polaris_ezmanage_exec_t, polaris_ezmanage_t)
`)

#####
## <summary>
## Read files under polaris_ezmanage_file_t label
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_manage_ezmanage_files`,`
gen_require(`
type polaris_ezmanage_file_t;
`)

manage_files_pattern($1, polaris_ezmanage_file_t , polaris_ezmanage_file_t)
read_lnk_files_pattern($1, polaris_ezmanage_file_t, polaris_ezmanage_file_t)
manage_dirs_pattern($1, polaris_ezmanage_file_t , polaris_ezmanage_file_t)
`)
```

```
#####
## <summary>
## Manage files under polaris_ezmanage_var_run_t label
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_manage_ezmanage_var_run_files`,`
gen_require(`
type polaris_ezmanage_var_run_t;
`)

manage_sock_files_pattern($1, polaris_ezmanage_var_run_t, polaris_ezmanage_var_run_t);
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmanage.if

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```
#
# February 2020, Victor Kamensky
#
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#
```

```
policy_module(polariscedge, 1.0);
```

```
# /tmp/xml handling
type polaris_cedge_xml_tmp_t;
files_tmp_file(polaris_cedge_xml_tmp_t)
```

```
# PLEASE LOOK AT ME very strange choice of directory name
```

```
# /tmp/tmp/ handling
type polaris_cedge_tmp_t;
files_tmp_file(polaris_cedge_tmp_t)
```

```
# /etc/viptela handling
type polaris_cedge_etc_t;
files_config_file(polaris_cedge_etc_t)
```

```
# /dev/shm handling
type polaris_cedge_tmpfs_t;
```

```

files_tmpfs_file(polaris_cedge_tmpfs_t)

# /tmp/.econfd2sysmgr-ipc handling
type polaris_econfd2sysmgr_tmp_t;
files_tmp_file(polaris_econfd2sysmgr_tmp_t)

# vconfd_script_reboot.sh policy
polaris_vconfd_domain_template(vconfd_reboot)

# vconfd_script_if_reset.sh policy
polaris_vconfd_domain_template(vconfd_ifreset)

# vconfd_script_get_config.sh policy
polaris_vconfd_domain_template(vconfd_cfg)

#####
# vconfd_script_*_stats policy
polaris_vconfd_domain_template(vconfd_history)
corecmd_exec_bin(polaris_vconfd_history_t)

# performs 'rm /tmp/xml/Pfr/Pfr-1600801323.xml.gz'....but, do not know where
polaris_cedge_tmp_manage(polaris_vconfd_history_t)

# performs 'ls -rt /tmp/xml/UtdUrlf-IOX' etc.
polaris_cedge_xml_tmp_manage(polaris_vconfd_history_t)

# vconfd_script_manage_list_stats.sh performs operations on
# /tmp/vconfd/stats.XXXXXXX
polaris_vconfd_tmp_manage(polaris_vconfd_history_t)
#####
# software policy
polaris_vconfd_domain_template(vconfd_software)

# nms policy
polaris_vconfd_domain_template(vconfd_nms)

# device policy
polaris_vconfd_domain_template(vconfd_device)

# internal policy
polaris_vconfd_domain_template(vconfd_reset)

# cert policy
polaris_vconfd_domain_template(vconfd_cert)

#####
# csr policy
polaris_vconfd_domain_template(vconfd_csr)

```

```

# vconfd_script_show_csr.sh invokes vlog
# /bin/sh vlog ...
# vlog is implemented in viptela/Utils/vlog using logger; that needs
# - ceate/connect unix_dgram_socket
# - read from devtmpfs of type devlog_t
# - write to sock_file of type devlog_t
# - sendto path="/run/systemd/journal/dev-log" of type unix_dgram_socket
logging_send_syslog_msg(polaris_vconfd_csr_t)
corecmd_exec_bin(polaris_vconfd_csr_t)

# reads /usr/share/viptela/server.csr
polaris_bootflash_read(polaris_vconfd_csr_t)
#####
# serial vsmart-upload vedge-upload policy
polaris_vconfd_domain_template(vconfd_serialnum)

# crash policy
polaris_vconfd_domain_template(vconfd_crash)

# aaa policy
polaris_vconfd_domain_template(vconfd_aaa)

# container policy
polaris_vconfd_domain_template(vconfd_contr)

# iox policy
polaris_vconfd_domain_template(vconfd_iox)

# utd policy
polaris_vconfd_domain_template(vconfd_utd)

# geo policy
polaris_vconfd_domain_template(vconfd_geo)

# vconfd_script_vnping.sh, vconfd_script_vping.sh, vconfd_script_vtraceroute.sh
# scripts policy
polaris_vconfd_domain_template(vconfd_net)

# runs ip command
sysnet_domtrans_ifconfig(polaris_vconfd_net_t)
# runs confd_cmd
corecmd_exec_bin(polaris_vconfd_net_t)

polaris_conf_d_connect(polaris_vconfd_net_t)

# /tmp/ polaris_vconfd_cert_t handling
type polaris_vconfd_cert_tmp_t;

```

```

files_tmp_file(polaris_vconfd_cert_tmp_t)
files_tmp_filetrans(polaris_vconfd_cert_t, polaris_vconfd_cert_tmp_t, { file dir })
polaris_vconfd_cert_tmp_manage(polaris_vconfd_cert_t)

# permit access to polaris_vconfd_cert_t
allow polaris_vconfd_cert_t self:capability { chown dac_override };

logging_send_syslog_msg(polaris_vconfd_cert_t)

corecmd_sbin_entry_type(polaris_vconfd_cert_t)
corecmd_shell_entry_type(polaris_vconfd_cert_t)

fs_read_nsfs_files(polaris_vconfd_cert_t)
logging_create_devlog_dev(polaris_vconfd_cert_t)

# to access the /bootflash: as the cert is stored in /bootflash:
# IOS cert related CLIs can create/store the certs in /bootflash with any
# file name(s), so allow generic access to bootflash.
polaris_bootflash_manage(polaris_vconfd_cert_t)

# manage /etc/viptela
polaris_cedge_etc_manage(polaris_vconfd_cert_t)
polaris_cedge_reset_ns(polaris_vconfd_cert_t)

# needed for accessing /tmp/chassis/local/rp/chasfs/midplane/chassis_model
polaris_chasfs_read(polaris_vconfd_cert_t)

#access to /etc/viptela
gen_require(
    type polaris_nginx_t;
)
polaris_cedge_etc_manage(polaris_nginx_t)

# For "confd_cmd", allow polaris_vconfd_cert_t, which is not a Binos process,
# to access polaris_confd_ipc_rpc_port_t.
polaris_rpc_confd_ipc_connect(polaris_vconfd_cert_t)

# permit to access /var/run/netns/default
sysnet_manage_ifconfig_run(polaris_vconfd_cert_t)

# vconfd_script_show_root_ca_cert.sh performs operations on
# /tmp/vconfd/root_cert.XXXXXXX
polaris_vconfd_tmp_manage(polaris_vconfd_cert_t)
fs_getattr_tmpfs(polaris_vconfd_cert_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedge.te

```

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```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris CPLD Policy Rules.</summary>

#####
# CPLD Driver policy
#####

#####
## <summary>
##   Read cpld files in /sys directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpld_read`,`
gen_require(`
type polaris_sysfs_cpld_t;
    type sysfs_t;
`)
    read_files_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file { read getattr };
    list_dirs_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
`)

#####
## <summary>
##   Write cpld files in /sys directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```

interface(`polaris_cpld_write`,`
gen_require(`
type polaris_sysfs_cpld_t;
    type sysfs_t;
`)
manage_files_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
manage_dirs_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
# genfscon statement specifically excludes symbolic links from
# genfscon path specific entries. To workaround, let us allow
# to follow sysfs_t symbolic links
allow $1 sysfs_t:lnk_file { read getattr };
`)

```

```
#####
```

```

## <summary>
##   Work (read, write, ioctl) with /dev/cpld
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cpld_dev_use`,`
gen_require(`
type device_t;
type polaris_cpld_device_t;
`)
write_chr_files_pattern($1, device_t, polaris_cpld_device_t)
read_chr_files_pattern($1, device_t, polaris_cpld_device_t)
allow $1 polaris_cpld_device_t:chr_file map;
`)

```

```
#####
```

```

## <summary>
##   Work (read,ioctl) with /dev/cpld
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cpld_dev_read`,`
gen_require(`
type device_t;
type polaris_cpld_device_t;

```

```
)  
    read_chr_files_pattern($1, device_t, polaris_cpld_device_t)  
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpld.if

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```
#  
# August 2017, Victor Kamensky  
#  
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# All rights reserved  
#
```

```
policy_module(polariscrankshaft, 1.0);
```

```
# spa devices i.e sys_platform_module_1ng  
type polaris_spa_device_t;  
dev_node(polaris_spa_device_t)
```

```
# htdp device  
type polaris_htdp_device_t;  
dev_node(polaris_htdp_device_t)
```

```
# bde device (/dev/linux-user-bde)  
type polaris_bde_device_t;  
dev_node(polaris_bde_device_t)
```

```
# dash fpga device (/dev/dash_fpga)  
type polaris_dash_device_t;  
dev_node(polaris_dash_device_t)
```

```
# nios device (/dev/nios)  
type polaris_nios_device_t;  
dev_node(polaris_nios_device_t)
```

```
# qae device (/dev/qae_mem)  
type polaris_qae_device_t;  
dev_node(polaris_qae_device_t)
```

```
# moka fpga device (/dev/moka_fpga)  
type polaris_mokafpga_device_t;  
dev_node(polaris_mokafpga_device_t)
```

```
# sirius fpga device (/dev/sirius_fpga)  
type polaris_siriusfpga_device_t;  
dev_node(polaris_siriusfpga_device_t);
```

```

# moka nim device (/dev/nim_dm*)
type polaris_nim_dm_device_t;
dev_node(polaris_nim_dm_device_t)

# /dev/bp_async device on nanook platform
type polaris_bp_async_device_t;
dev_node(polaris_bp_async_device_t)

# /dev/sparrow_psu device on sparrow platform
type polaris_sparrow_psu_device_t;
dev_node(polaris_sparrow_psu_device_t)

# /dev/nutella_fpga device on nutella platform
type polaris_nutella_fpga_device_t;
dev_node(polaris_nutella_fpga_device_t)

# /dev/huron_fpga on Sumatra platform
type polaris_huron_device_t;
dev_node(polaris_huron_device_t)

# /dev/dplr_sumatra on Sumatra platform
type polaris_sumatra_doppler_device_t;
dev_node(polaris_sumatra_doppler_device_t)

# /tmp/sata_status for mSATA
type polaris_sata_status_tmp_t;
files_tmp_file(polaris_sata_status_tmp_t)

# TSN tsn_platform.tdl for IPCs and processes definition and it uses
# crankshaft_platform.tdl for databases definition. Unfortunately they are
# out of sync wrt BPROC_NGWC_FED - crankshaft_platform.tdl refers it but
# tsn_platform.tdl does not contain such definition.
#ifdef(^tsn_platform',`
type polaris_ngwc_fed_t;
`)

# Supernova supernova_platform.tdl for IPCs and processes definition and it uses
# crankshaft_platform.tdl for databases definition. Unfortunately they are
# out of sync wrt BPROC_FM_RP - crankshaft_platform.tdl refers it but
# supernova_platform.tdl does not contain such definition.
#ifdef(^supernova_platform',`
type polaris_fman_rp_t;
`)

# Nanook
# The Nanook platform does not support SDWAN and so the SDWAN processes are not
# defined in the nanook_platform.tdl. However, it uses the database_def's from

```

```

# the crankshaft_platform.tdl, which do have the SDWAN databases. So we need to
# add the processes to the SELinux policy
ifdef(`nanook_platform',`
type polaris_cfgmgr_t;
type polaris_cxp_t;
type polaris_dbgd_t;
type polaris_fpm_t;
type polaris_ftm_t;
type polaris_omp_t;
type polaris_sdavc_proxy_t;
type polaris_ttm_t;
type polaris_vdaemon_t;
type polaris_htx_t;
`)

#####
# load_usbnet policies start
#####
# /usr/binos/conf/load_usbnet.sh is invoked to load usb network driver module
# kernel/drivers/net/usb/usbnet.ko for TSN.
#####

polaris_process_domain_template(load_usbnet)

# allow polaris_load_usbnet_t access to execute programs in system bin dirs, load
# usbnet.ko for USB network interface for TSN and allow read access
# to /sys/class/net and /proc/cmdline
# LOOK AT ME: /tmp/tp/pvp/work/inot_fifo inotifywait fd leak to child
corecmd_exec_bin(polaris_load_usbnet_t)
modutils_exec_insmod(polaris_load_usbnet_t)
modutils_list_module_config(polaris_load_usbnet_t)
modutils_read_module_config(polaris_load_usbnet_t)
sysnet_manage_config_dirs(polaris_load_usbnet_t)
polaris_pvp_stdin_read(polaris_load_usbnet_t)
files_read_kernel_modules(polaris_load_usbnet_t)
dev_rw_sysfs(polaris_load_usbnet_t)
kernel_read_system_state(polaris_load_usbnet_t)

# stdout inherited from unconfined_service that might call it
polaris_unconfined_service_fifo_file_manage(polaris_load_usbnet_t)

# handle /tmp/load_usbnet_intf
type polaris_load_usbnet_tmp_t;
files_tmp_file(polaris_load_usbnet_tmp_t)
files_tmp_filetrans(polaris_load_usbnet_t, polaris_load_usbnet_tmp_t, file)
manage_files_pattern(polaris_load_usbnet_t, polaris_load_usbnet_tmp_t, polaris_load_usbnet_tmp_t)

```

```

# allow read of /etc/passwd
# allow map permission
# passwd_file_t:file { getattr open read };
auth_map_passwd(polaris_load_usbnet_t)

#####
# load_usbnet policies end
#####

#####
# CLI: show platform hardware msata <status/info>
#####
ifdef(`crankshaft_family',`
gen_require(
    type polaris_sysfs_ggpio_t;
    type polaris_msata_info_t;
)

polaris_utility_domain_template(msata_info)
polaris_bexecute_domain(polaris_msata_info_t, polaris_msata_info_exec_t)
# need write for pipes like "pipe:[70623]"
corecmd_exec_bin(polaris_msata_info_t)
# need write/getattr for pipes like "pipe:[71322]"
polaris_cmrp_use_fifo(polaris_msata_info_t)
fstools_domtrans(polaris_msata_info_t)
# allow use of mSATA device
polaris_nvram_manage(polaris_msata_info_t)
# allow self
allow polaris_msata_info_t self:capability sys_rawio;
allow polaris_msata_info_t self:process setfscreate;
# allow /usr/sbin/smartctl to access /sys/devices/platform/cpn-110-master/
# cpn-110-master:config-space/f2540000.sata/ata2/host1/scsi_host/host1/proc_name and
# /sys/devices/platform/cpn-110-master/cpn-110-master:config-space/f2540000.sata/
# ata2/host1/target1:0:0
read_files_pattern(polaris_msata_info_t, polaris_sysfs_ggpio_t, polaris_sysfs_ggpio_t)
dev_list_sysfs(polaris_msata_info_t)
# allow smartctl to access to /dev/sda to determine its lifetime
storage_raw_read_fixed_disk(polaris_msata_info_t)

# CLI: show platform hardware slot p[x] fan eeprom
polaris_utility_domain_template(smart_fan)
polaris_bexecute_domain(polaris_smart_fan_t, polaris_smart_fan_exec_t)
# allow /ls command
corecmd_exec_bin(polaris_smart_fan_t)
# allow read of /etc/passwd
auth_map_passwd(polaris_smart_fan_t)
# allow read of /sys/devices/platform/nios/*
dev_read_sysfs(polaris_smart_fan_t)

```

```

# need write/getattr access for pipes like "pipe:[86004]"
polaris_cmprp_use_fifo(polaris_smart_fan_t)

# sumatra and sparrow platforms need map access for "show platform hardware msata status | lifetime"
auth_map_passwd(polaris_msata_info_t)
')

#ifdef(^sumatra_platform')
# During "show platform hardware msata status | lifetime" - msata_info.sh accesses /tmp/sata_status
files_tmp_filetrans(polaris_msata_info_t, polaris_sata_status_tmp_t, file)
manage_files_pattern(polaris_msata_info_t, polaris_sata_status_tmp_t, polaris_sata_status_tmp_t)
')

#####
# show platform hardware msata end
#####

#type for /dev/qcqmIX
type qcqmi_device_t;
dev_node(qcqmi_device_t);

# sm_nim_adpt device (/dev/sm_nim_adpt_XXX )
type polaris_sm_nim_adpt_device_t;
dev_node(polaris_sm_nim_adpt_device_t)

# dio device
type polaris_dio_device_t;
dev_node(polaris_dio_device_t)

# tty NMEA device
type polaris_tty_NMEA_device_t;
dev_node(polaris_tty_NMEA_device_t)

# memory blocks and gpp on Nutella-XE platform
type polaris_nutella_memory_block_p7_t;
dev_node(polaris_nutella_memory_block_p7_t)

type polaris_nutella_memory_block_p1_t;
dev_node(polaris_nutella_memory_block_p1_t)

type polaris_nutella_memory_block_boot_t;
dev_node(polaris_nutella_memory_block_boot_t)

type polaris_nutella_gp0_t;
dev_node(polaris_nutella_gp0_t)

type polaris_nutella_gpp_t;
dev_node(polaris_nutella_gpp_t)

```

```
# nim device (/dev/nim_phy)
type polaris_nim_phy_device_t;
dev_node(polaris_nim_phy_device_t)
```

```
type polaris_cwan_svr_var_run_t;
files_pid_file(polaris_cwan_svr_var_run_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.te

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris epc_ws_liaison Policy Rules.</summary>
```

```
interface(`polaris_epc_ws_liaison_tmp_read`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    read_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
`)
```

```
#####
```

```
## <summary>
```

```
## Allow to open, write, add_name and write /tmp/epc_ws/fed_to_wif_pipe file.
```

```
## Allow to create and write /tmp/epc_ws dir.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## epc_ws_liaison and ngwc-fed fifo_file interaction.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_epc_ws_liaison_fifo_manage`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
    manage_fifo_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
`)
```

```
#####
```

```

## <summary>
## Allow to open, read "/tmp/epc_ws/wif_to_ts_pipe" fifo file.
##
## </summary>
## <param name="domain">
## <summary>
## epc_ws_liaison and dumpcap fifo_file interaction.
## </summary>
## </param>
#
interface(`polaris_epc_ws_liaison_fifo_read`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    read_fifo_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
`)

#####
## <summary>
## Allow to write, create, unlink "/tmp/*.pcapng" temporary files.
##
## </summary>
## <param name="domain">
## <summary>
## polaris_wireshark_show fifo_file interaction.
## </summary>
## </param>
#
interface(`polaris_wireshark_show_tmp_manage`,`
    gen_require(`
        type polaris_wireshark_show_tmp_t;
    `)
    manage_files_pattern($1, polaris_wireshark_show_tmp_t, polaris_wireshark_show_tmp_t)
`)

#####
## <summary>
## Create, read, and write temporary files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_epc_ws_liaison_tmp_file`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)

```

```
files_tmp_filetrans($1, polaris_epc_ws_liaison_tmp_t, dir, "epc_ws")
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisepcwsliaison.if
```

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```
#
```

```
# February 2020, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polariscxp, 1.0);
```

```
gen_require(^
```

```
    type polaris_cxp_t;
```

```
')
```

```
polaris_chasfs_read(polaris_cxp_t)
```

```
polaris_cpld_read(polaris_cxp_t)
```

```
logging_send_syslog_msg(polaris_cxp_t)
```

```
# vconfd_load_shared_schemas
```

```
polaris_confid_shared_schema_read(polaris_cxp_t)
```

```
corecmd_exec_bin(polaris_cxp_t)
```

```
corecmd_exec_shell(polaris_cxp_t)
```

```
auth_use_nsswitch(polaris_cxp_t)
```

```
# work with /tmp/xml
```

```
polaris_cedge_xml_tmp_manage(polaris_cxp_t)
```

```
# work with /tmp/tmp
```

```
polaris_cedge_tmp_manage(polaris_cxp_t)
```

```
# /var/run/cxp dir and pid
```

```
type polaris_cxp_var_run_t;
```

```
files_pid_file(polaris_cxp_var_run_t)
```

```
manage_files_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
```

```
manage_dirs_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
```

```
manage_sock_files_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
```

```
files_pid_filetrans(polaris_cxp_t, polaris_cxp_var_run_t, { file dir sock_file })
```

```
polaris_ttm_var_sock_write(polaris_cxp_t)
```

```
# vip_execute_nowait uses setpgid
```

```
allow polaris_cxp_t self:process setpgid;
```

```
# cxp may create vrf-based netns on demand  
polaris_vrf_netns_manage(polaris_cxp_t)
```

```
# Allow /usr//cxpd manages /usr/binos/conf/global.service.conf and  
# /tmp/tdlresolve/  
polaris_tdlresolve_manage(polaris_cxp_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscxp.te
```

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```
#  
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#  
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# All rights reserved  
#
```

```
/usr/binos/conf/viptela-start.sh -- gen_context(system_u:object_r:polaris_cedge_start_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedgestart.fc
```

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```
dnl  
dnl April 2018, Victor Kamensky  
dnl  
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.  
dnl All rights reserved  
dnl  
divert(-1)
```

```
include(`polaris_process.m4')
```

```
include(`polaris_database_db.m4')  
include(`polaris_database_db_te.m4')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl  
#  
# This is a generated file! Instead of modifying this file,  
# modify proper platform TDL file.  
#  
policy_module(polarisplatformdbauto, 1.0);
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_te.m4

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris vman Policy Rules.</summary>

#####
## <summary>
##   Read files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_tmp_read`,`
    gen_require(`
        type polaris_vman_tmp_t;
    `)
    read_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)
`)

#####
## <summary>
##   Write files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_tmp_write`,`
    gen_require(`
        type polaris_vman_tmp_t;
    `)
    write_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)
`)
```

```
#####
## <summary>
##   Manage dir/files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_tmp_manage`,`
  gen_require(`
    type polaris_vman_tmp_t;
  `)
  manage_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)
  manage_dirs_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)
`)

#####
## <summary>
##   Read files of type polaris_disk_vman_t (e.g., /bootflash/virtual-instance/)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_vman_read`,`
  gen_require(`
    type polaris_disk_vman_t;
  `)
  read_files_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
  read_lnk_files_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
  list_dirs_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
`)

#####
## <summary>
##   List files of type polaris_disk_vman_t (e.g., /bootflash/virtual-instance/)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_vman_dir_list`,`
```

```

gen_require(
    type polaris_disk_vman_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
)
list_dirs_pattern($1, { polaris_disk_vman_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
polaris_disk_vman_t)
)

```

```

#####
## <summary>
## Operate on @vman_domain_socket unix socket. Look at
## vman_clnt_msg_transport_init function in vman_clnt_msg_uds.c
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_vman_use_client_socket`,`
gen_require(
    type polaris_vman_t;
)
allow $1 polaris_vman_t:unix_stream_socket connectto;
)

```

```

#####
## <summary>
## Manage /tmp/xml/
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_vman_log_files_manage`,`
optional_policy(
gen_require(
    type polaris_vman_log_t;
)

manage_files_pattern($1, polaris_vman_log_t,polaris_vman_log_t)
manage_dirs_pattern($1, polaris_vman_log_t, polaris_vman_log_t)
)

```

```
)

#####
## <summary>
##   Read files of type polaris_var_vman_t (e.g., /var/virtual-instance)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_var_read`,`
    gen_require(`
        type polaris_var_vman_t;
    `)
    list_dirs_pattern($1, polaris_var_vman_t, polaris_var_vman_t)
    read_files_pattern($1, polaris_var_vman_t, polaris_var_vman_t)
`)
```

```
#####
## <summary>
##   Write into fifo file created by vman, typical case when
##   vman starts script under popen in different domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_vman_use_fifo`,`
    gen_require(`
        type polaris_vman_t;
    `)

    read_fifo_files_pattern($1, polaris_vman_t, polaris_vman_t)
    write_fifo_files_pattern($1, polaris_vman_t, polaris_vman_t)
`)
```

```
#####
## <summary>
##   Check existence (getattr) of vman btrace file (i.e
## polaris_vman_bt_t)
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_vman_bt_getattr`,`
    gen_require(`
        type polaris_vman_bt_t;
        type polaris_btrace_base_t;
    `)
    setattr_files_pattern($1, polaris_btrace_base_t, polaris_vman_bt_t)
`)

```

```

#####
## <summary>
## Allow domain to write to pipes connected to virtlogd_t.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_vman_virtlog_allow`,`
    gen_require(`
        type virtlogd_t;
    `)

    #allow domain to write to pipes
    allow $1 virtlogd_t:fifo_file rw_inherited_fifo_file_perms;

    #allow virtlogd_t to search dirs /var/log/libvirt/qemu
    logging_search_logs(virtlogd_t)
`)

```

```

#####
## <summary>
## Allow polaris_vman_t to kill process from domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_vman_kill_process`,`
    gen_require(`
        type polaris_vman_t;
    `)

```

```
allow polaris_vman_t $1:process sigkill;
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvman.if

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```
#
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#
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#
```

```
## <summary>Polaris tws Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Allow the specified domain to manage KGV data files
```

```
## I.e /tmp/package_biv_sums.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_kgv_data_manage`,`
```

```
gen_require(`
```

```
type polaris_kgv_data_t;
```

```
`)
```

```
manage_files_pattern($1, polaris_kgv_data_t, polaris_kgv_data_t)
```

```
allow $1 polaris_kgv_data_t:file map;
```

```
')
```

```
#####
```

```
## <summary>
```

```
## Execute a domain transition to run code_sign_verify
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed to transition.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_code_verify_domtrans`,`
```

```
gen_require(`
```

```

        type polaris_code_verify_t, polaris_code_verify_exec_t;
    ')

    domtrans_pattern($1, polaris_code_verify_exec_t, polaris_code_verify_t)
')

#####
## <summary>
##   Execute a domain transition to the polaris_hw_upgrade
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_hw_upgrade_domtrans`,`
    gen_require(`
        type polaris_hw_upgrade_t, polaris_hw_upgrade_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_hw_upgrade_exec_t, polaris_hw_upgrade_t)
')

#####
## <summary>
##   Work (read, write, ioctl) with /dev/aikido device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_aikido_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_aikido_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_aikido_device_t)
    read_chr_files_pattern($1, device_t, polaris_aikido_device_t)
')

#####
## <summary>
##   Execute a domain transition to the polaris_rom_upgrade

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_rom_upgrade_domtrans`,`
    gen_require(`
        type polaris_hw_upgrade_t, polaris_rom_upgrade_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_rom_upgrade_exec_t, polaris_rom_upgrade_t)
)

#####
## <summary>
## Write into fifo file created during rommon_upgrade
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_rom_upgrade_use_fifo`,`
    gen_require(`
        type polaris_rom_upgrade_t;
    `)

    write_fifo_files_pattern($1, polaris_rom_upgrade_t, polaris_rom_upgrade_t)
)

#####
## <summary>
## Work (read, write, ioctl) with /dev/scansta device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_scansta_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_scansta_device_t;
    `)

```

```
)
    write_chr_files_pattern($1, device_t, polaris_scansta_device_t)
    read_chr_files_pattern($1, device_t, polaris_scansta_device_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristws.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
/tmp/*/chasfs(/.*)?      gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/chassis/local/*/chasfs(/.*) gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/chassis            gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/chassis(/.*)      gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/*/chasync(/.*)?    gen_context(system_u:object_r:polaris_chasync_tmp_t,s0)
```

```
/vol/harddisk/sys_report(/.*)? gen_context(system_u:object_r:polaris_chasync_files_t,s0)
```

```
/vol/harddisk/fp_cc_crash(/.*)? gen_context(system_u:object_r:polaris_chasync_files_t,s0)
```

```
/var/log/chasync(/.*)?  gen_context(system_u:object_r:polaris_chasync_log_t,s0)
```

```
/usr/binos/conf/chasync.sh -- gen_context(system_u:object_r:polaris_chasync_exec_t,s0)
```

```
# real path is /etc/init.d/chasfs_boottime.sh but we need to add rc.d because
```

```
# in file_contexts.subs_dist we have substitute rule for /etc/init.d/
```

```
/etc/rc.d/init.d/chasfs_boottime.sh -- gen_context(system_u:object_r:polaris_chasfs_boottime_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarischasfs.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/tmp/.CRDU_COMMAND_PIPE      gen_context(system_u:object_r:polaris_crdu_pipe_tmp_t,s0)
```

```
/tmp/.CRDU_RESPONSE_PIPE     gen_context(system_u:object_r:polaris_crdu_pipe_tmp_t,s0)
```

```
/usr/binos/conf/trans_ports_helper.sh -- gen_context(system_u:object_r:polaris_trans_ports_helper_exec_t,s0)
```

```
/usr/binos/conf/trans_stats_helper.sh -- gen_context(system_u:object_r:polaris_trans_stats_helper_exec_t,s0)
/usr/binos/conf/mcp_disk_oir.sh      -- gen_context(system_u:object_r:polaris_disk_oir_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmand.fc
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarissmand, 1.0);
```

```
gen_require(  
    type polaris_smand_t;  
    type polaris_smand_exec_t;  
)
```

```
polaris_btrace_data_manage(polaris_smand_t)
```

```
polaris_crft_data_manage(polaris_smand_t)
```

```
polaris_chasfs_manage(polaris_smand_t)
```

```
polaris_tdlresolve_read(polaris_smand_t)
```

```
polaris_tdlldb_list_dirs(polaris_smand_t)
```

```
polaris_cpld_read(polaris_smand_t)
```

```
polaris_lua_read(polaris_smand_t)
```

```
polaris_flashlib_read(polaris_smand_t)
```

```
polaris_send_signal_to_bexecute(polaris_smand_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_smand_t)
```

```
polaris_db_tdlldb_dir_use(polaris_smand_t)
```

```
type polaris_crdu_pipe_tmp_t;  
files_tmp_file(polaris_crdu_pipe_tmp_t)  
files_tmp_filetrans(polaris_smand_t, polaris_crdu_pipe_tmp_t, fifo_file, ".CRDU_COMMAND_PIPE")  
files_tmp_filetrans(polaris_smand_t, polaris_crdu_pipe_tmp_t, fifo_file, ".CRDU_RESPONSE_PIPE")  
polaris_smand_crdu_pipe_manage(polaris_smand_t)
```

```
# work with /tmp/sman files
```

```
type polaris_smand_tmp_t;
```

```
files_tmp_file(polaris_smand_tmp_t)
```

```
manage_dirs_pattern(polaris_smand_t, polaris_smand_tmp_t, polaris_smand_tmp_t)
```

```
manage_files_pattern(polaris_smand_t, polaris_smand_tmp_t, polaris_smand_tmp_t)
```

```
files_tmp_filetrans(polaris_smand_t, polaris_smand_tmp_t, { file dir })
```

```

# allow read of /etc/group
auth_use_nsswitch(polaris_smand_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_smand_t)

# allow objstore access
polaris_disk_objstore_read(polaris_smand_t)

# on edison smand shares sysv semaphore with iosd, why sem got initrc_t label
# is not clear.
gen_require(
    type initrc_t;
)
allow polaris_smand_t initrc_t:sem { read write unix_write associate };

# why smand needs all these capability?
allow polaris_smand_t self:capability { dac_override chown fsetid };
allow polaris_smand_t self:capability2 block_suspend;
allow polaris_smand_t self:capability sys_resource;

# on edison smand wants to read /proc/mtd which is proc_t
# type=AVC msg=audit(1478481219.216:6): avc: denied { read } for pid=5410 comm="smand" name="mtd"
dev="proc" ino=4026535811 scontext=system_u:system_r:polaris_smand_t:s0
tcontext=system_u:object_r:proc_t:s0 tclass=file
# try to drop it latter
kernel_read_system_state(polaris_smand_t)

# on edison silent roll package is still in iso format
# type=AVC msg=audit(1478497356.229:7): avc: denied { getattr } for pid=5816 comm="smand"
path="/tmp/sw/mount/cat3k_caa-srdriver.2016-11-06_21.10_kamensky.SSA.pkg/usr/binos/lib64" dev="loop7"
ino=3456 scontext=system_u:system_r:polaris_smand_t:s0 tcontext=system_u:object_r:iso9660_t:s0 tclass=dir
gen_require(
    type iso9660_t;
)
allow polaris_smand_t iso9660_t:dir { search getattr };

polaris_dynconf_tmp_read(polaris_smand_t)

corecmd_exec_shell(polaris_smand_t)

# CLI "Show install issu history" invokes /usr/binos/conf/install_issu_show.py which
# needs /usr/bin/python3(bin file) execution
corecmd_exec_bin(polaris_smand_t)

# smand execute install_show.sh in its own domain need read results
polaris_install_show_tmp_read(polaris_smand_t)

```

```

# during boot issu_boottime.sh calls smand to obtain some information
gen_require(
    type unconfined_service_t;
)
domtrans_pattern(unconfined_service_t, polaris_smand_exec_t, polaris_smand_t)

# system_stats_periodic function from sman/src/fru_stats.c does
# ioctl(fd, SIOCGIFADDR, &ifr); on "system" interface name, which normally
# does not exist in Polaris platforms
kernel_dontaudit_request_load_module(polaris_smand_t)

# system_stats_periodic function from sman/src/fru_stats.c does
# statfs64 for /flash directory
fs_getattr_xattr_fs(polaris_smand_t)
polaris_disk_bootflash_read_lnk(polaris_smand_t)
polaris_disk_bootflash_search(polaris_smand_t)

gen_require(
    type rsync_t;
)
# upon exec rsync inherits smand's stdout/stderr fifo files
allow rsync_t polaris_smand_t:fifo_file write;

gen_require(
    type polaris_bshell_t;
)
polaris_chasfs_read(polaris_bshell_t)
polaris_tdlresolve_read(polaris_bshell_t)

# bshell memory logs related
type polaris_memmon_tmp_files_t;
files_tmp_file(polaris_memmon_tmp_files_t)
files_tmp_filetrans(unconfined_service_t, polaris_memmon_tmp_files_t, dir, "memmon_logs")
## give bshell permissions
manage_files_pattern(polaris_bshell_t, polaris_memmon_tmp_files_t, polaris_memmon_tmp_files_t)

# sman needs to access gnmib gnoi images
optional_policy(
    polaris_gnmib_gnoi_images_read(polaris_smand_t)
)

# CLI "Show install issu history" access to "/bootflash/.installer/install_issu_history"
# and "/tmp/show_install_output.txt"
polaris_install_engine_domtrans(polaris_smand_t)
polaris_install_show_domtrans(polaris_smand_t)

# xcopy_script gets called for xcopy RPC data model

```

```

polaris_xcopy_script_domtrans(polaris_smand_t)

#
=====
=
# "sh ip ports" CLI policies, execute trans_ports_helper.sh script
polaris_utility_domain_template(trans_ports_helper)
# transit into the domain
domtrans_pattern(polaris_smand_t, polaris_trans_ports_helper_exec_t, polaris_trans_ports_helper_t)
#binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_trans_ports_helper_t)
# execute "tail" command
corecmd_exec_bin(polaris_trans_ports_helper_t)
corecmd_exec_shell(polaris_trans_ports_helper_t)
polaris_proc_fd_all_getattr(polaris_trans_ports_helper_t)
# getattr all polaris_domain
domain_getattr_all_domains(polaris_trans_ports_helper_t)
# run mcp_chvrf.sh without transition
polaris_exec_chvrf(polaris_trans_ports_helper_t)
fs_read_nsfs_files(polaris_trans_ports_helper_t)

# lsof options tcp reads /proc/net/raw
kernel_read_network_state(polaris_trans_ports_helper_t)
# ls access to /proc/3792/fd/6 triggers sys_ptrace capability
allow polaris_trans_ports_helper_t self:capability { sys_ptrace };

# allow file and directory read and execute permission checks
allow polaris_trans_ports_helper_t self:capability dac_read_search;

# map /etc/passwd
auth_use_nsswitch(polaris_trans_ports_helper_t)

type polaris_trans_ports_tmp_t;
files_tmp_file(polaris_trans_ports_tmp_t)
# create /tmp/trans_ports_tmp and /tmp/trans_ports_result
files_tmp_filetrans(polaris_trans_ports_helper_t, polaris_trans_ports_tmp_t, file, "show_ports_tmp")
files_tmp_filetrans(polaris_trans_ports_helper_t, polaris_trans_ports_tmp_t, file, "show_ports_result")
polaris_trans_ports_tmp_manage(polaris_trans_ports_helper_t)
# smand open and unlinks /tmp/trans_ports_tmp
polaris_trans_ports_tmp_manage(polaris_smand_t)
#
=====
=
# "show platform software kernel ..." CLI executes trans_stats_helper.sh. Need domain
# transition
#
polaris_utility_domain_template(trans_stats_helper)
# transit into the domain

```

```

domtrans_pattern(polaris_smand_t, polaris_trans_stats_helper_exec_t, polaris_trans_stats_helper_t)
#binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_trans_stats_helper_t)
#execute lsof in helper script
corecmd_exec_bin(polaris_trans_stats_helper_t)
corecmd_exec_shell(polaris_trans_stats_helper_t)
auth_use_nsswitch(polaris_trans_stats_helper_t)
# lsof reads /proc/*/fd/* attributes
polaris_proc_fd_all_getattr(polaris_trans_stats_helper_t)

# lsof options tcp reads /proc/net/raw
kernel_read_network_state(polaris_trans_stats_helper_t)

# lsof reads /proc/locks
kernel_read_system_state(polaris_trans_stats_helper_t)

# lsof readmnt
fs_read_nsfs_files(polaris_trans_stats_helper_t)

# ls access to /proc/3792/fd/6 triggers sys_ptrace capability
# and dac_read_search as well.
allow polaris_trans_stats_helper_t self:capability { sys_ptrace dac_read_search };

type polaris_trans_stats_tmp_t;
files_tmp_file(polaris_trans_stats_tmp_t)
# create /tmp/trans_tmp and /tmp/trans_tmp.1 to store lsof output
files_tmp_filetrans(polaris_trans_stats_helper_t, polaris_trans_stats_tmp_t, file, "trans_tmp")
files_tmp_filetrans(polaris_trans_stats_helper_t, polaris_trans_stats_tmp_t, file, "trans_tmp.1")
polaris_trans_stats_tmp_manage(polaris_trans_stats_helper_t)
# smand open and unlinks /tmp/trans_tmp
polaris_trans_stats_tmp_manage(polaris_smand_t)

# run mcp_chvrf.sh without transition
polaris_exec_chvrf(polaris_trans_stats_helper_t)

#
=====
=====
# CLI "request platform hardware filesystem harddisk: offline | online" which runs mcp_disk_oir.sh

polaris_utility_domain_template(disk_oir)
polaris_bexecute_domain(polaris_disk_oir_t, polaris_disk_oir_exec_t)

#execute lsof
corecmd_exec_bin(polaris_disk_oir_t)

# This is a CLI script that access types and /proc/pid/fd/*
polaris_proc_fd_all_getattr(polaris_disk_oir_t)

```

```

# access sysctl_rpc_t
kernel_read_rpc_sysctls(polaris_disk_oir_t)

# reads /proc/net/*
kernel_read_network_state(polaris_disk_oir_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_disk_oir_t)

# lsof readmnt
fs_read_nsfs_files(polaris_disk_oir_t)

#inherits stdin/stdout of pty opened by telnetd
telnet_use_ptys(polaris_disk_oir_t)

allow polaris_disk_oir_t self:capability { dac_read_search sys_nice sys_rawio };
allow polaris_disk_oir_t self:process { setfscreate setsched };

# execute lvm commands
lvm_domtrans(polaris_disk_oir_t)

# "lsof -nP"read /dev/sda1 (/csl_p_0) and other operations when disk is destroyed.
storage_manage_fixed_disk(polaris_disk_oir_t)

# access /tmp/chassis/cpld/chasfs
polaris_chasfs_read(polaris_disk_oir_t)

#cat /tmp/chassis/cpld/chasfs/platform_type'
polaris_cpld_read(polaris_disk_oir_t)

#'/bin/rm -rf /tmp/udev/etc/udev/harddisk'
fs_getattr_tmpfs(polaris_disk_oir_t)

# access /tmp/udev/etc/udev/harddisk'
polaris_udev_tmp_manage(polaris_disk_oir_t)

# /bin/mkdir -p /tmp/udev_cache/harddisk
files_tmp_filetrans(polaris_disk_oir_t, polaris_udev_tmp_files_t, dir, "udev_cache")

# systemctl start handle_mount@vol-harddisk.service, communicate with systemd
systemd_exec_systemctl(polaris_disk_oir_t)
# mount /dev/harddisk1 /vol/harddisk
mount_domtrans(polaris_disk_oir_t)

# read /proc/cmdline
kernel_read_all_proc(polaris_disk_oir_t)

```

```

# system service start/stop: /lib/systemd/system/handle_mount@.service
systemd_config_generic_services(polaris_disk_oir_t)

#/sbin/hdparm -S 0 /dev/sdb, execute hdparm in its own domain
fstools_domtrans(polaris_disk_oir_t)

ifdef(`crankshaft_family',`
    gen_require(`
        type device_t;
        type udev_t;
    ')
    filetrans_pattern( {udev_t polaris_disk_oir_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk")
    filetrans_pattern( {udev_t polaris_disk_oir_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
    manage_lnk_files_pattern(polaris_disk_oir_t, fixed_disk_device_t, fixed_disk_device_t)
    # /dev/harddisk may be labeled with device_t. The "unlink" AVC denial will be fixed when it is labeled correctly

    # allow /bin/dd to access /dev/nvme in blk_file
    dev_nvme_blk_files_manage(polaris_disk_oir_t)

    # allow /bin/cat to access /tmp/nim_xxd_present
    gen_require(`
        type polaris_cmrp_nim_xxd_tmp_t;
    ')
    read_files_pattern(polaris_disk_oir_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)
)

#watches of /tmp/[rp|fp|cc]/pvp/process_state directory
polaris_process_state_watch(polaris_smand_t)

ifdef(`petra_platform',`
#allow access to polaris_cm_rp sem
polaris_cm_rp_sem_use(polaris_smand_t)
#allow access to /flash12/moncfg/cfg.dat
polaris_swipedrive_file_manage(polaris_smand_t)
#allow access to /flash6/moncfg/cfg.dat
polaris_nvram_read(polaris_smand_t)
)
dmesg_domtrans(polaris_smand_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmand.te
No license file was found, but licenses were detected in source scan.

#
# July 2017, Victor Kamensky
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.

```

```
# All rights reserved
#

# pci rescan shm file
/dev/shm/rescan_shm          gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismcc.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# August 2017, Shawn Lu
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris mobilityd Policy Rules.</summary>
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismobilityd.if
No license file was found, but licenses were detected in source scan.
```

```
#
# September 2018, Anubha Balani
#
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# All rights reserved
#
```

```
policy_module(polarismemory, 1.0);
```

```
#####
# Polaris memory: libmaroon and such
#####
```

```
attribute polaris_maroon_data_domain;
```

```
type polaris_maroon_base_t;
files_type(polaris_maroon_base_t)
```

```
typeattribute polaris_maroon_base_t polaris_maroon_data_domain;
```

```
gen_require(
    attribute polaris_extended_domain;
)
```

```
files_tmp_filetrans(polaris_extended_domain, polaris_maroon_base_t, dir, "maroon_stats")
```

```
type polaris_zram_device_t;
dev_node(polaris_zram_device_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismemory.te

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
# polarisemd file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisemd.fc

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris nif_mgr Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Use /tmp/sv directory and files. Currently this acts as a
## chasfs root for information shared between the nif manager
## and the fed.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_sv_tmp_use',`
```

```
gen_require(`
```

```
type polaris_sv_tmp_t;
```

```
type tmp_t;
```

```
`)
```

```

manage_dirs_pattern($1, tmp_t, polaris_sv_tmp_t)
manage_files_pattern($1, polaris_sv_tmp_t, polaris_sv_tmp_t)
allow $1 polaris_sv_tmp_t:dir watch;
')

#####
## <summary>
## This is to allow creation and write to
## doppler_sesa file under proc
##
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_proc_sesa_create_write`,`
gen_require(`
type polaris_proc_sesa_t;
`)

setattr_files_pattern($1, polaris_proc_sesa_t, polaris_proc_sesa_t)
rw_files_pattern($1, polaris_proc_sesa_t, polaris_proc_sesa_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

/usr/binos/conf/btdecode -- gen_context(system_u:object_r:polaris_btdecode_exec_t,s0)
/usr/binos/conf/bttail -- gen_context(system_u:object_r:polaris_btdecode_exec_t,s0)
/usr/binos/conf/mcp_trace_filter.sh -- gen_context(system_u:object_r:polaris_trace_filter_exec_t,s0)
/usr/binos/conf/mcp_trace_request.sh -- gen_context(system_u:object_r:polaris_trace_request_exec_t,s0)

/usr/binos/bin/create_luid_file_db -- gen_context(system_u:object_r:polaris_create_ldb_exec_t,s0)
/tmp/btrace_luids_file.cdb.tmp -- gen_context(system_u:object_r:polaris_ldb_tmp_t,s0)
/tmp/btrace_luids_file.cdb -- gen_context(system_u:object_r:polaris_ldb_tmp_t,s0)

/tmp/cc/0/trace(/.*)? gen_context(system_u:object_r:polaris_btrace_base_t,s0)
/tmp/cc/0/trace/fifo(/.*)? gen_context(system_u:object_r:polaris_fifo_stdout_base_t,s0)

```

```

/tmp/fp/trace(/.*)?      gen_context(system_u:object_r:polaris_btrace_base_t,s0)
/tmp/fp/trace/fifo      gen_context(system_u:object_r:polaris_fifo_stdout_base_t,s0)
/tmp/fp/trace/fifo(/.*)?  gen_context(system_u:object_r:polaris_fifo_stdout_t,s0)
/tmp/rp/trace(/.*)?      gen_context(system_u:object_r:polaris_btrace_base_t,s0)
/tmp/rp/trace/fifo      gen_context(system_u:object_r:polaris_fifo_stdout_base_t,s0)
/tmp/rp/trace/fifo(/.*)?  gen_context(system_u:object_r:polaris_fifo_stdout_t,s0)

/dev/shm/sem\uuid_sem    gen_context(system_u:object_r:polaris_btrace_tmpfs_t,s0)
/dev/shm/oper_uuid_shm  gen_context(system_u:object_r:polaris_btrace_tmpfs_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtrace.fc
No license file was found, but licenses were detected in source scan.

```

```

#
# September 2017, Victor Kamensky
#
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#

# polarisunconfined file contexts place holder

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisunconfined.fc
No license file was found, but licenses were detected in source scan.

```

```

#
# February 2020, Victor Kamensky
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#

```

```

policy_module(polarisdbg, 1.0);

```

```

gen_require(
    type polaris_dbg_d_t;
)
polaris_chasfs_read(polaris_dbg_d_t)
polaris_tdlresolve_read(polaris_dbg_d_t)
polaris_cpld_read(polaris_dbg_d_t)

```

```

logging_send_syslog_msg(polaris_dbg_d_t)

```

```

# vconfd_load_shared_schemas
polaris_confid_shared_schema_read(polaris_dbg_d_t)

```

```
# /var/run/.dbgd socket and pid
type polaris_dbgd_var_run_t;
files_pid_file(polaris_dbgd_var_run_t)
manage_files_pattern(polaris_dbgd_t, polaris_dbgd_var_run_t, polaris_dbgd_var_run_t)
manage_sock_files_pattern(polaris_dbgd_t, polaris_dbgd_var_run_t, polaris_dbgd_var_run_t)
files_pid_filetrans(polaris_dbgd_t, polaris_dbgd_var_run_t, { file sock_file })
```

```
polaris_vdaemon_var_sock_write(polaris_dbgd_t)
```

```
# dbgd may create vrf-based netns on demand
polaris_vrf_netns_manage(polaris_dbgd_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbgd.te
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2020, Victor Kamensky
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris JVM Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisjvm.if
```

No license file was found, but licenses were detected in source scan.

```
# All rights reserved
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstall.te
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristws.te
```

No license file was found, but licenses were detected in source scan.

```
#
# December 2018, Victor Kamensky
#
# Copyright (c) 2018-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisezmancc, 1.0);
```

```
gen_require(
    type polaris_ezman_cc_t;
)
```

```
polaris_chasfs_read(polaris_ezman_cc_t)
polaris_cpld_read(polaris_ezman_cc_t)
polaris_tdlresolve_read(polaris_ezman_cc_t)

polaris_ripc_sman_ui_serv_connect(polaris_ezman_cc_t)
```

```
allow polaris_ezman_cc_t self:capability dac_override;
```

```
polaris_oob_evfc_dev_use(polaris_ezman_cc_t)
# LOOK AT ME by some reason relabeling of /dev/ezlkdm
# device files does not work
dev_rw_generic_chr_files(polaris_ezman_cc_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisezmancc.te
No license file was found, but licenses were detected in source scan.
```

```
#
# Oct 2020, Xin Xiang
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisdoppler, 1.0);
```

```
# doppler interrupt device
type polaris_dplr_device_t;
dev_node(polaris_dplr_device_t)
```

```
# dma mmap device
type polaris_dmammap_device_t;
dev_node(polaris_dmammap_device_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdoppler.te
No license file was found, but licenses were detected in source scan.
```

```
#
# Nov 2020, Swati Kumari
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris PTPD Policy Rules.</summary>
```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/blzi_fpga
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_blzi_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_blzi_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_blzi_device_t)
    read_chr_files_pattern($1, device_t, polaris_blzi_device_t)
    allow $1 polaris_blzi_device_t:chr_file map;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisptpdrp.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris cpp_cp Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcp.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polariscppdriver, 1.0);
```

```
gen_require(`
    type polaris_cpp_driver_t;
```

```

)

polaris_btrace_data_manage(polaris_cpp_driver_t)
polaris_crft_data_manage(polaris_cpp_driver_t)
polaris_chasfs_manage(polaris_cpp_driver_t)
polaris_tdlresolve_read(polaris_cpp_driver_t)
polaris_tdlldb_list_dirs(polaris_cpp_driver_t)
polaris_cpld_read(polaris_cpp_driver_t)
polaris_flashlib_read(polaris_cpp_driver_t)

polaris_ripc_sman_ui_serv_connect(polaris_cpp_driver_t)

polaris_cpp_process(polaris_cpp_driver_t)
polaris_cpp_dev_use(polaris_cpp_driver_t)

# allow read variety of system information from sysfs
# type=AVC msg=audit(1479601620.503:19): avc: denied { open } for pid=22839 comm="cpp_driver"
path="/sys/devices/system/node/node0/meminfo" dev="sysfs" ino=805
scontext=system_u:system_r:polaris_cpp_driver_t:s0 tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_read_sysfs(polaris_cpp_driver_t)

optional_policy(`
# cpp_driver reads qfp executable to look at .stabs sections that
# contains qfp code fixups, then this fixup data is passed to kernel
# module to modify qfp code.
gen_require(`
    type bin_t;
    type polaris_qfp_exec_t;
)
read_files_pattern(polaris_cpp_driver_t, bin_t, polaris_qfp_exec_t)
)

polaris_icc_broken_relocations(polaris_cpp_driver_t)

# work with /dev/i2c devices
polaris_i2c_use(polaris_cpp_driver_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_driver_t)

logging_send_syslog_msg(polaris_cpp_driver_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_driver_t)
)

# allow access to /tmp/octeon-remote-lock-pci***

```

```

# This is required as part of cpp_driver access of octeon chip.
# As part of the init, call is made to octeon_remote_lock()
# which requires access to the /tmp file.
#ifdef(`crankshaft_family',`
polaris_cm_fp_tmp_filetrans(polaris_cpp_driver_t)
polaris_cm_fp_tmp_manage(polaris_cpp_driver_t)
')

# LOOK AT ME on overload cpp_driver needs access to /dev/cavium_e
# and /dev/pcie0 devices, on 1ng cpp_driver needs access to
# /dev/yoda0_tree2, etc
dev_rw_generic_chr_files(polaris_cpp_driver_t)

# /dev/cpp_il on qwlc
optional_policy(`
polaris_cpp_il_dev_use(polaris_cpp_driver_t)
')

#ifdef(`qwlc_platform',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
')

#ifdef(`katar_platform',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
')

#ifdef(`mcp_family',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
')

optional_policy(`
polaris_cpp_htdp_dev_use(polaris_cpp_driver_t)
polaris_cbdma_dev_use(polaris_cpp_driver_t)
polaris_cpp_htdp_dev_use(polaris_cpp_driver_t)
')

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppdriver.te
No license file was found, but licenses were detected in source scan.

#
# August 2017, Shawn Lu
#
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#

## <summary>Polaris odm_proxy Policy Rules.</summary>

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.if

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisbtrace, 1.0);

#####

# Btrace policy

#####

gen\_require(`

attribute domain;

attribute polaris\_extended\_domain;

attribute unconfined\_domain\_type;

')

# persistent btrace files stored under btrace\_data

type polaris\_btrace\_data\_t;

files\_type(polaris\_btrace\_data\_t)

# allow btrace data file reside on persistent storage

polaris\_pfile\_type(polaris\_btrace\_data\_t)

type polaris\_fifo\_stdout\_t;

files\_type(polaris\_fifo\_stdout\_t)

type polaris\_fifo\_stdout\_base\_t;

files\_type(polaris\_fifo\_stdout\_base\_t)

attribute polaris\_btrace\_data\_domain;

type polaris\_btrace\_base\_t;

files\_type(polaris\_btrace\_base\_t)

typeattribute polaris\_btrace\_base\_t polaris\_btrace\_data\_domain;

typeattribute polaris\_btrace\_data\_t polaris\_btrace\_data\_domain;

# is "trace" in tmp\_t specific enough? Maybe we would need to change it in polaris

files\_tmp\_filetrans(polaris\_extended\_domain, polaris\_btrace\_base\_t, dir, "trace")

# udev -> cat9k-ssd.mount -> unifiedfs\_rsycn\_udev.sh -> btrace.sh might also create this dir

files\_tmp\_filetrans(udev\_t, polaris\_btrace\_base\_t, dir, "trace")

```

gen_require(
    attribute polaris_extended_domain;
    type polaris_pvp_tmp_t;
)
filetrans_pattern(polaris_extended_domain, polaris_pvp_tmp_t, polaris_btrace_base_t, dir, "trace")

# filetrans_pattern(polaris_extended_domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t, dir, "fifo")
filetrans_pattern(domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t, dir, "fifo")
filetrans_pattern(domain, polaris_fifo_stdout_base_t, polaris_fifo_stdout_t, fifo_file)
manage_dirs_pattern(polaris_extended_domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t)

polaris_utility_domain_template(btdecode)

# any polaris process except iosd can execve btdecode utility to decode its own traces
gen_require(
    attribute polaris_domain;
    type polaris_iosd_t;
)
domtrans_pattern(polaris_domain - polaris_iosd_t, polaris_btdecode_exec_t, polaris_btdecode_t)
corecmd_check_exec_shell(polaris_domain - polaris_iosd_t)

# btdecode not only reads btrace files, but also creates copy of the file
polaris_btrace_data_manage_all(polaris_btdecode_t)
polaris_btrace_persistent_data_manage(polaris_btdecode_t)

polaris_use_btrace_fifo(polaris_btdecode_t)
polaris_tdlresolve_read(polaris_btdecode_t)
polaris_boot_tmp_read(polaris_btdecode_t)
polaris_lua_read(polaris_btdecode_t)
polaris_chasfs_read(polaris_btdecode_t)
polaris_cpld_read(polaris_btdecode_t)
polaris_bootflash_manage(polaris_btdecode_t)

# lua files need to read executables to retrieve btrace meta informations
files_mmap_all_files(polaris_btdecode_t)

# could be called on trace files on persistent storage
polaris_persistent_read(polaris_btdecode_t)

# need to read executables to retrieve btrace meta informations
polaris_read_exec_domain(polaris_btdecode_t)

corecmd_exec_bin(polaris_btdecode_t)
corecmd_exec_shell(polaris_btdecode_t)

# allow read of /etc/group and /etc/passwd

```

```

auth_use_nsswitch(polaris_btdecode_t)

# executes luajit
allow polaris_btdecode_t self:process execmem;

# tmp files created by /lua/btdecode.lua in /tmp
type polaris_btdecode_tmp_t;
files_tmp_file(polaris_btdecode_tmp_t)
files_tmp_filetrans(polaris_btdecode_t, polaris_btdecode_tmp_t, file)
manage_files_pattern(polaris_btdecode_t, polaris_btdecode_tmp_t, polaris_btdecode_tmp_t)

# /lua/btdecode.lua may call create_luid_file_db on demand
polaris_create_ldb_domtrans(polaris_btdecode_t)

# in some cases it runs with telnet /dev/ptyN as stdin/stdout
# example when executed on other node, or "monitor log profile"
# command
telnet_use_ptys(polaris_btdecode_t)

# Allow btdecode to read/write /dev/pts/*
term_use_generic_ptys(polaris_btdecode_t)

polaris_btrace_ldb_tmp_read(polaris_btdecode_t)

# Allow btdecode to watch over /bootflash/tracelogs, /vol/harddisk/tarcelogs and /flash2/CRASH/tracelogs
polaris_btrace_data_watch(polaris_btdecode_t)

# Allow btdecode to watch over /usr/binos/conf
files_watch_usr_dirs(polaris_btdecode_t)

#Allow btdecode to access UFS mounted directories for other members
optional_policy(`
polaris_ncd_tmp_read(polaris_btdecode_t)
`)

# btrace_rotate calls ftw function through create_luid_file_db utility
# that walks whole file tree in order to create btrace_luids_file.cdb
# let's have separate domain for this utility
polaris_utility_domain_template(create_ldb)

files_read_all_files(polaris_create_ldb_t)
files_getattr_all_dirs(polaris_create_ldb_t)
files_read_all_symlinks(polaris_create_ldb_t)
files_list_non_security(polaris_create_ldb_t)
files_dontaudit_list_security_dirs(polaris_create_ldb_t)
files_mmap_all_files(polaris_create_ldb_t)

# allow luid database scripts to read/write /dev/pts/*

```

```

term_use_generic_ptys(polaris_create_ldb_t)

# creates files like btrace_luids_file.cdb_20170907160108.tmp, btrace_luids_file.cdb
type polaris_ldb_tmp_t;
files_tmp_file(polaris_ldb_tmp_t)
files_tmp_filetrans(polaris_create_ldb_t, polaris_ldb_tmp_t, file)
files_tmp_filetrans(polaris_btdecode_t, polaris_ldb_tmp_t, file, "btrace_luids_file.cdb")
manage_files_pattern(polaris_create_ldb_t, polaris_ldb_tmp_t, polaris_ldb_tmp_t)
mmap_files_pattern(polaris_create_ldb_t, polaris_create_ldb_t, polaris_create_ldb_t)
polaris_use_btrace_fifo(polaris_create_ldb_t)

# in some cases it runs with telnet /dev/ptyN as stdin/stdout
# example when executed on other node, or "monitor log profile"
# command
telnet_use_ptys(polaris_create_ldb_t)

# Allowing permission to read/open/getattr/ on
# /tmp/sw/mount/*universalk9.*.SSA.pkg/usr/binos/sbin/in.telnetd
gen_require(
    type telnetd_exec_t;
)
allow polaris_btdecode_t telnetd_exec_t:file { getattr open read };

#####
# CLI: show platform software trace filter-binary wired
# invokes.../bin/sh /usr/binos/conf/mcp_trace_filter.sh --binary wired
#####

polaris_utility_domain_template(trace_filter)

polaris_bexecute_domtrans(polaris_trace_filter_t)
polaris_bexecute_domain(polaris_trace_filter_t, polaris_trace_filter_exec_t)
# mcp_trace_filter.sh runs with telnet /dev/ptyN as
# stdin/stdout if on standby
telnet_use_ptys(polaris_trace_filter_t)

# script starts rsync with mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_trace_filter_t)

allow polaris_trace_filter_t self:capability { dac_override sys_resource };

# access /tmp/sw/boot/pkginfo
# awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_trace_filter_t)

polaris_chasfs_read(polaris_trace_filter_t)
polaris_disk_bootflash_read_lnk(polaris_trace_filter_t)
polaris_disk_crashinfo_getattr(polaris_trace_filter_t)

```

```

polaris_bootflash_manage(polaris_trace_filter_t)
polaris_use_btman_fifo(polaris_trace_filter_t)
polaris_use_btrace_fifo(polaris_trace_filter_t)
polaris_smand_use_fifo(polaris_trace_filter_t)
polaris_cpld_read(polaris_trace_filter_t)
polaris_tdlldb_list_dirs(polaris_trace_filter_t)
polaris_disk_harddisk_read_lnk(polaris_trace_filter_t)
kernel_read_system_state(polaris_trace_filter_t)

# read /proc/rmonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_trace_filter_t)

# df on "/" needs fs_t:filesystem getattr
fs_getattr_xattr_fs(polaris_trace_filter_t)

#Allow mcp_trace_request.sh to access UFS mounted directories for other members
optional_policy(`
polaris_ncd_tmp_read(polaris_trace_filter_t)
`)

# allow creation/access of temporary files created by bash such as
# /tmp/sh-thd-1499428203 etc
type polaris_trace_filter_tmp_t;
files_tmp_file(polaris_trace_filter_tmp_t)
files_tmp_filetrans(polaris_trace_filter_t, polaris_trace_filter_tmp_t, file)
manage_files_pattern(polaris_trace_filter_t, polaris_trace_filter_tmp_t, polaris_trace_filter_tmp_t)

# mcp_trace_filter.sh invokes: "df /tmp/rp/tdlldb" and "df /dev/shm"
fs_getattr_tmpfs(polaris_trace_filter_t)

# allow accesses to polaris lua files
polaris_lua_read(polaris_trace_filter_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_trace_filter_t)

corecmd_exec_bin(polaris_trace_filter_t)

# why does btrace show command needs to write into btrace state?
polaris_btrace_data_manage_all(polaris_trace_filter_t)
polaris_btrace_persistent_data_manage(polaris_trace_filter_t)

# Allow mcp_trace_request.sh to access NFS mounted directories for other members
# such as /tmp/ufs/harddisk/10.130.1.0
fs_getattr_nfs(polaris_trace_filter_t)

#####
# CLI: monitor log profile <iwan | wireless | wired ..>

```

```

# invokes.../bin/sh /usr/binos/conf/mcp_trace_request.sh --operation monitor
#####

polaris_utility_domain_template(trace_request)

polaris_bexecute_domtrans(polaris_trace_request_t)
polaris_bexecute_domain(polaris_trace_request_t, polaris_trace_request_exec_t)

# Provide sys_resource capability for sys_pipe calls
allow polaris_trace_request_t self:capability sys_resource;

polaris_cpld_read(polaris_trace_request_t)
polaris_disk_crashinfo_getattr(polaris_trace_request_t)
polaris_disk_bootflash_read_lnk(polaris_trace_request_t)
polaris_disk_harddisk_read_lnk(polaris_trace_request_t)
polaris_chasfs_manage(polaris_trace_request_t)

fs_getattr_xattr_fs(polaris_trace_request_t)

# can execute hostname
hostname_exec(polaris_trace_request_t)

# can execute dmesg
dmesg_domtrans(polaris_trace_request_t)

# creates archives under /crashinfo
polaris_disk_crashinfo_manage(polaris_trace_request_t)

# can tar logs to persistent all file systems (including removable file systems)
polaris_persistent_manage(polaris_trace_request_t)
polaris_removable_manage(polaris_trace_request_t)

# read and write all btrace fifo file as standard input/output.
polaris_use_btrace_fifo(polaris_trace_request_t)

# read /proc/rmbonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_trace_request_t)

# copies /tmp/silent_roll_select.log into /crashinfo so that it can be tar'd into an
# archive
polaris_pvp_read_tmp_files(polaris_trace_request_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_read(polaris_trace_request_t)

# in some cases mcp_trace_request.sh runs with telnet /dev/ptyN as
# stdin/stdout
telnet_use_ptys(polaris_trace_request_t)

```

```

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_trace_request_t)

# read /proc/cmdline
kernel_read_system_state(polaris_trace_request_t)

corecmd_exec_bin(polaris_trace_request_t)

ifdef(`ngwc_family',`
optional_policy(`
polaris_ncd_tmp_read(polaris_trace_request_t)
')
')

# mcp_trace_request.sh can read all btrace files both in temp storage
# as well as in persistent storage
polaris_btrace_data_manage_all(polaris_trace_request_t)
polaris_btrace_persistent_data_manage(polaris_trace_request_t)

# Allow mcp_trace_request.sh to create and manage temporary files under /tmp
# such as /tmp/mtr_cntrl
type polaris_trace_request_tmp_t;
files_tmp_file(polaris_trace_request_tmp_t)
files_tmp_filetrans(polaris_trace_request_t, polaris_trace_request_tmp_t, file)
manage_files_pattern(polaris_trace_request_t, polaris_trace_request_tmp_t, polaris_trace_request_tmp_t)

# Allow mcp_trace_request.sh to access NFS mounted directories for other members
# such as /tmp/ufs/crashinfo/10.1.1.1
fs_getattr_nfs(polaris_trace_request_t)

# mcp_trace_request.sh invokes dmesg, which runs in dmesg_t domain needs access
# to btrace data store
gen_require(`
    type dmesg_t;
')
polaris_btrace_persistent_data_manage(dmesg_t)
# dmesg invocation in case of disk being full,
# results in writing to area of disk that
# requires the sys_resource capability.
allow dmesg_t self:capability sys_resource;

# Set /tmp/udev_ng4k.vbd.log to be under polaris_udev_tmp_files_t label
gen_require(`
    type udev_t;
    type polaris_udev_tmp_files_t;
    type init_t;
')

```

```

files_tmp_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
fs_tmpfs_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
files_tmp_filetrans(init_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
fs_tmpfs_filetrans(init_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")

# Add permission for mcp_trace_request to access polaris_udev_tmp_files_t files
polaris_udev_tmp_manage(polaris_trace_request_t)

# Allow ls /tmp/ufs/harddisk
optional_policy(
polaris_ncd_tmp_read(polaris_trace_request_t)
)

#Allow mcp_trace_request to get tmpfs attributes
fs_getattr_tmpfs(polaris_trace_request_t)

#allow mcp_trace_request to execute tar
allow polaris_trace_request_t self:capability { chown fowner fsetid };

#####

type polaris_btrace_tmpfs_t;
files_tmpfs_file(polaris_btrace_tmpfs_t)

# btrace semaphore created by systemd-tmpfiles needs map permission
gen_require(
    type systemd_tmpfiles_t;
)
mmap_files_pattern(systemd_tmpfiles_t, polaris_btrace_tmpfs_t, polaris_btrace_tmpfs_t)

# Allow polaris processes to manage level config files in tracelogs persistent
# directory like /bootflash/tracelogs/level_config
type polaris_btrace_lvl_config_t;
files_type(polaris_btrace_lvl_config_t)
gen_require(
    attribute polaris_domain;
)
polaris_btrace_lvl_config_manage(polaris_domain)

optional_policy(
    polaris_cedge_tanman_tmp_manage(polaris_btdecode_t)
)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtrace.te
No license file was found, but licenses were detected in source scan.

#

```

```
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#

/usr/binos/conf/psvp.sh -- gen_context(system_u:object_r:polaris_psvp_exec_t,s0)

/tmp/rp/psvp      -d gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)
/tmp/rp/psvp/inot_fifo -p gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)
/tmp/rp/psvp/pvp\pid -- gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsvp.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2017, Victor Kamensky
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisbexecute, 1.0);
```

```
polaris_utility_domain_template(bexecute)
```

```
polaris_utility_domain_template(chvrf)
```

```
polaris_bexecute_domtrans(polaris_chvrf_t)
polaris_chvrf_domtrans(polaris_bexecute_t)
polaris_ngio_module_session_domtrans(polaris_bexecute_t)
```

```
polaris_rom_upgrade_use_fifo(polaris_chvrf_t)
```

```
#####
# bexecute
#####
corecmd_exec_bin(polaris_bexecute_t)
```

```
# allow read of /etc/passwd
auth_use_nsswitch(polaris_bexecute_t)
```

```
dev_setattr_null_dev(polaris_bexecute_t)
```

```
polaris_btrace_data_manage(polaris_bexecute_t)
polaris_crft_data_manage(polaris_bexecute_t)
polaris_chasfs_manage(polaris_bexecute_t)
```

```

polaris_cpuld_read(polaris_bexecute_t)
polaris_boot_tmp_read(polaris_bexecute_t)
polaris_rmonbifo_tmp_read(polaris_bexecute_t)
polaris_proc_rmonbifo_read(polaris_bexecute_t)
polaris_dyncfg_tmp_read(polaris_bexecute_t)
polaris_read_debug_conf(polaris_bexecute_t)
polaris_tdlldb_list_dirs(polaris_bexecute_t)
polaris_disk_bootflash_read_lnk(polaris_bexecute_t)
polaris_disk_harddisk_read_lnk(polaris_bexecute_t)

# open/read /tmp/sw/rp/max_elastic_bays
polaris_pvp_read_tmp_files(polaris_bexecute_t)

# search/getattr of /tmp/udev/etc/udev
polaris_udev_tmp_list_dirs(polaris_bexecute_t)

# manage files in /tmp/pman_ports
polaris_pman_manage_tmp_files(polaris_bexecute_t)

# brelay.sh does rm -rf of "/tmp/pman_ports/gdbport/9910"
# This checks tmpfs file system attributes
#
# Denial is observed after "show platform software audit summary"
# which uses brelay to trigger corresponding audit_log.sh script
fs_getattr_tmpfs(polaris_bexecute_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_bexecute_t)

# follow /tftp/inv symlink to /tmp/chassis/local/rp/chasfs/inventory
gen_require(
    type tftpd_rw_t;
)
read_lnk_files_pattern(polaris_bexecute_t, tftpd_rw_t, tftpd_rw_t)

# tries to do mkdir -p /tmp/rp/lipc, but it should exist already so
# getattr should be sufficient
polaris_lipc_getattr(polaris_bexecute_t)

# read /proc/cmdline
kernel_read_system_state(polaris_bexecute_t)

# binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_bexecute_t)

# write into pipe that smand created for us with popen
polaris_smand_use_fifo(polaris_bexecute_t)

```

```

allow polaris_bexecute_t self:capability { chown setgid setuid fowner net_admin };
allow polaris_bexecute_t self:process { setpgid setcap };

# temporary files created by bexecute like /tmp/get_status_type_pkg_list.rp-1-0-0.20170707094059.out.log
type polaris_bexecute_tmp_t;
files_tmp_file(polaris_bexecute_tmp_t)
files_tmp_filetrans(polaris_bexecute_t, polaris_bexecute_tmp_t, file)
manage_files_pattern(polaris_bexecute_t, polaris_bexecute_tmp_t, polaris_bexecute_tmp_t)

# smand calls many commands through bexec.sh
polaris_smand_domain(polaris_bexecute_t, polaris_bexecute_exec_t)

# hman invokes cpp_shm_mgr_info_show.sh which in turn invokes "mktemp -p /tmp/tmppub..."
polaris_btrace_tmppub_manage(polaris_bexecute_t)

ifdef(`nyquist_platform',`
term_use_unallocated_ttys(polaris_bexecute_t)
term_setattr_unallocated_ttys(polaris_bexecute_t)
')

ifdef(`radium_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)

# allow /usr/binos/conf/bexecute.sh for tcp_socket access
# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /usr/binos/conf/module_direct.py
# 0 bp0 PROMETHIUM-L"
gen_require(`
type polaris_cm_rp_t;
')
allow polaris_chvrf_t polaris_cm_rp_t:tcp_socket ioctl;

# allow /usr/binos/conf/bexecute.sh for tcp_socket access
# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /bin/mcp_pkg_wrap rp_daemons
# /usr/binos/conf/execute_co"
gen_require(`
type polaris_dmi_ncsshd_fwd_t;
')
allow polaris_chvrf_t polaris_dmi_ncsshd_fwd_t:tcp_socket ioctl;
')

ifdef(`sumatra_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
')

ifdef(`nanook_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
')

```

```

)

ifdef(`supernova_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
)

polaris_issu_tmp_files_manage(polaris_bexecute_t)

# Unlike other platforms, quake platform has runin_exec_proc.sh script,
# which is started by xinetd in inetd_t domain,
# and needs to switch to bexecute domain.
# In turn, runin_exec_proc.sh then starts in.telnetd process which needs
# to run in telnetd_t domain, for the existing policies to do the rest.
ifdef(`quake_platform',`
gen_require(`
    type inetd_t;
    type telnetd_t;
    type telnetd_exec_t;
)
polaris_bexecute_domtrans(inetd_t)
polaris_bexecute_domain(telnetd_t, telnetd_exec_t)
)

#####
# chvrf
#####
corecmd_exec_bin(polaris_chvrf_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_chvrf_t)

# read polaris vrf net namespace file(s) /var/run/netns/0
fs_read_nsfs_files(polaris_chvrf_t)

# write into pipe that various binos processes created for us with popen
polaris_smand_use_fifo(polaris_chvrf_t)
polaris_hman_use_fifo(polaris_chvrf_t)
polaris_dmiauthd_use_fifo(polaris_chvrf_t)
optional_policy(`
    polaris_cmprp_use_fifo(polaris_chvrf_t)
)
optional_policy(`
    polaris_dmi_ncsshd_fwd_use_fifo(polaris_chvrf_t)
)

# mcp_chvrf.sh may run into files created by bexecute
manage_files_pattern(polaris_chvrf_t, polaris_bexecute_tmp_t, polaris_bexecute_tmp_t)

```

```

# init may transition to polaris_chvrf_t - certain systemd units use
# mcp_chvrf.sh to start services
gen_require(`
    type init_t;
`)
polaris_chvrf_domtrans(init_t)

# mcp_chvrf.sh used to start xinetd services
gen_require(`
    type inetd_t;
    type inetd_exec_t;
`)
domtrans_pattern(polaris_chvrf_t, inetd_exec_t, inetd_t)

# in some cases mcp_chvrf needs to write into someone fifo stdout
# file, i.e when called from ncd.sh script
polaris_use_btrace_fifo(polaris_chvrf_t)

sysnet_domtrans_ifconfig(polaris_chvrf_t)

# during some execve calls chvrf needs list /tmp/etc
polaris_etc_list(polaris_chvrf_t)

ifdef(`ngwc_family',`
# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
`)

ifdef(`mcp_family',`
# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
`)

ifdef(`wlc_family',`
# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
`)

# For "request platform software system shell" CLI, we have:

```

```

# /bin/sh /usr/binos/conf/mcp_chvrf.sh eobc /usr/binos/conf/bexecute.sh
#
#         -c /usr/binos/conf/mcp_record_shell.sh
# mcp_chvrf.sh needs read/write access to /dev/pts/1:
# allow polaris_chvrf_t telnetd_devpts_t:chr_file { read write };
telnet_use_ptys(polaris_chvrf_t)

ifdef(`nyquist_platform',`
term_use_unallocated_ttys(polaris_chvrf_t)
')

# some times run with unix_stream_socket as stdin
init_ioctl_stream_sockets(polaris_chvrf_t)

#####
# bexecute and mcp_chvrf.sh called from install_show.sh
#####

polaris_install_show_tmp_write(polaris_bexecute_t)
polaris_install_show_tmp_write(polaris_chvrf_t)

#####
# install_engine.sh uses brelay to re-launch install_engine in all FRUs.
# So, op_rp_switch_to_remote_loc_in_parallel() outputs to install tmp log file;
# check invocation-point for comms_run_on_remote_fru.
#####
polaris_install_tmp_log_write(polaris_bexecute_t)
polaris_install_tmp_log_write(polaris_chvrf_t)

#####
# CLI: show platform hardware cpp active infrastructure shared-memory all
# this results in hman invoking following chain of shell scrips.
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/bash /usr/binos/conf/bexecute.sh -c /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/sh /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/bash /usr/binos/conf/bshell.sh -S -c "show platform hardware qfp active \
#         infrastructure shared-memory process cpp-control-process"
# All these are executed in polaris_bexecute_t domain and write access to following lipc
# is needed: /tmp/rp/lipc/shell_mgr_bshell_serv_socket
#####
polaris_sman_bshell_serv_lipc_write(polaris_bexecute_t)
polaris_tdlresolve_read(polaris_bexecute_t)
#####
# This block is policies for "sh pla so process memory r0 name iosd maps" CLI

polaris_utility_domain_template(process_maps)

polaris_bexecute_domain(polaris_process_maps_t, polaris_process_maps_exec_t)

```

```

# needs to read maps files.
domain_read_all_domains_state(polaris_process_maps_t)

# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_process_maps_t)
kernel_read_system_state(polaris_process_maps_t)

# need write/ioctl/getattr access for pipes like "pipe:[118396]"
polaris_hman_use_fifo(polaris_process_maps_t)

corecmd_exec_bin(polaris_process_maps_t)
#####
# This block is policies for "request platform software system shell" CLI.
# Eventually, mcp_record_shell.sh is invoked. That needs its own domain.

polaris_utility_domain_template(platform_shell)

polaris_bexecute_domain(polaris_platform_shell_t, polaris_platform_shell_exec_t)
corecmd_exec_bin(polaris_platform_shell_t)
auth_use_nsswitch(polaris_platform_shell_t)

polaris_btrace_persistent_data_manage(polaris_platform_shell_t)
polaris_cpld_read(polaris_platform_shell_t)

# cyan libraries access /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_platform_shell_t)

# pglobals.sh accesses /tmp/ufs//crashinfo on cat9k platforms
optional_policy(
polaris_ncd_tmp_read(polaris_platform_shell_t)
')

# mcp_record_shell.sh needs read access to chasfs
polaris_chasfs_read(polaris_platform_shell_t)

# mcp_record_shell.sh needs read access to /dev/pts/0 (telnetd_devpts_t)
telnet_use_ptys(polaris_platform_shell_t)

#   rsync /tmp/system_shell_access_logs/$system_shell_access_log_file
#           rsync://rp0-0/chasfs/etc/system_shell_access_logs/.
gen_require(
    type rsync_t;
    ')
rsync_entry_domtrans(polaris_platform_shell_t, rsync_t)
allow rsync_t polaris_platform_shell_t:process sigchld;
telnet_use_ptys(rsync_t)

```

```

logging_send_syslog_msg(polaris_platform_shell_t)
init_list_pid_dirs(polaris_platform_shell_t)

#when reload command is issued, needs "kill" capability
allow polaris_platform_shell_t self:capability kill;

# brelay started from telnetd as result it inherits stdin/stdout of pty opened
# by telnetd
telnet_use_ptys(polaris_bexecute_t)
gen_require(
    type telnetd_devpts_t;
)
allow polaris_bexecute_t telnetd_devpts_t:chr_file setattr_chr_file_perms;
allow polaris_bexecute_t self:capability fsetid;

# mcp_record_shell.sh invokes:
# /usr/bin/script -q /harddisk/tracelogs/system_shell_R0*
# - needs access to /root/.bash_history
# - performs chmod on /dev/pts/2 (needs fsetid on self)
# - ioctl/open/read/write on /dev/ptmx
# - needs read/search access to /harddisk/tracelogs
type polaris_bash_tmp_t;
files_type(polaris_bash_tmp_t)
filetrans_pattern(domain, user_home_dir_t, polaris_bash_tmp_t, file, ".bash_history")
polaris_bash_tmp_manage(polaris_platform_shell_t)
allow polaris_platform_shell_t self:capability fsetid;
term_use_generic_ptys(polaris_platform_shell_t)
term_setattr_generic_ptys(polaris_platform_shell_t)
term_getattr_pty_fs(polaris_platform_shell_t)
term_use_ptmx(polaris_platform_shell_t)
polaris_disk_bootflash_read_lnk(polaris_platform_shell_t)
polaris_disk_harddisk_read_lnk(polaris_platform_shell_t)

# mcp_record_shell.sh invokes:
# mkdir /tmp/system_shell_access_logs
# create /tmp/system_shell_access_logs/SHELL_ACCESSED_*
type polaris_platform_shell_tmp_t;
files_tmp_file(polaris_platform_shell_tmp_t)
files_tmp_filetrans(polaris_platform_shell_t, polaris_platform_shell_tmp_t, dir, "system_shell_access_logs")
files_tmp_filetrans(polaris_platform_shell_t, polaris_platform_shell_tmp_t, file)
manage_dirs_pattern(polaris_platform_shell_t, polaris_platform_shell_tmp_t, polaris_platform_shell_tmp_t)
manage_files_pattern(polaris_platform_shell_t, polaris_platform_shell_tmp_t, polaris_platform_shell_tmp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_platform_shell_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_read(polaris_platform_shell_t)

```

```

polaris_disk_crashinfo_getattr(polaris_platform_shell_t)
#####

polaris_utility_domain_template(shell)

term_use_generic_ptys(polaris_shell_t)

domtrans_pattern(polaris_platform_shell_t, polaris_shell_exec_t, polaris_shell_t)

# reload command needs the following policies to send signal
polaris_send_signal_to_bexecute(polaris_platform_shell_t)
polaris_send_signal_to_shell(polaris_platform_shell_t)

## <desc>
## <p>
## Polaris "request platform system shell" drops into unconfined shell
## </p>
## </desc>
gen_tunable(polaris_dev_shell, true)

tunable_policy(`polaris_dev_shell`,`
    polaris_unconfined_domain(polaris_shell_t)
`)
polaris_domain_storage_unconfined_type(polaris_shell_t)

# PLEASE LOOK AT ME do we have to many ports open
# btelnet runs under bexecute in case of guest shell console access
# command like app-hosting connect appid guestshell console
allow polaris_bexecute_t self:tcp_socket { connect create setopt };
corenet_tcp_connect_unreserved_ports(polaris_bexecute_t)
sysnet_read_config(polaris_bexecute_t)

# brelay.sh does ls /tmp/ufs//crashinfo on cat9k
allow polaris_bexecute_t self:capability dac_override;
polaris_disk_crashinfo_getattr(polaris_bexecute_t)
optional_policy(`
polaris_ncd_tmp_read(polaris_bexecute_t)
`)

polaris_utility_domain_template(bconsole)

polaris_boot_tmp_read(polaris_bconsole_t)
polaris_btrace_data_manage(polaris_bconsole_t)
polaris_chasfs_read(polaris_bconsole_t)
polaris_cpld_read(polaris_bconsole_t)
polaris_proc_rmonbifo_read(polaris_bconsole_t)

```

```

polaris_rmonbifo_tmp_read(polaris_bconsole_t)
polaris_use_btrace_fifo(polaris_bconsole_t)
polaris_show_provision_temp_read(polaris_bconsole_t)

corecmd_exec_bin(polaris_bconsole_t)
polaris_bexecute_domtrans(polaris_bconsole_t)

allow polaris_bconsole_t self:process setrlimit;

# handling /var/run/agetty-iosd.pid
type polaris_bconsole_var_run_t;
files_pid_file(polaris_bconsole_var_run_t)
manage_files_pattern(polaris_bconsole_t, polaris_bconsole_var_run_t, polaris_bconsole_var_run_t)
files_pid_filetrans(polaris_bconsole_t, polaris_bconsole_var_run_t, file, "agetty-iosd.pid")

# access /dev/ttyS0
term_use_unallocated_ttys(polaris_bconsole_t)

auth_use_nsswitch(polaris_bconsole_t)

#####
# This block is policies for
# "request platform software console attach switch standby RO" CLI.
# It invokes usr/binos/conf/mcp_console_attach.sh, eventually invoking
# ioucon binary, to telnet to standby.

polaris_utility_domain_template(mcp_console_attach)
polaris_bexecute_domain(polaris_mcp_console_attach_t, polaris_mcp_console_attach_exec_t)
corecmd_exec_bin(polaris_mcp_console_attach_t)
polaris_bexecute_domtrans(polaris_mcp_console_attach_t)
allow polaris_mcp_console_attach_t self:process setpgid;
polaris_chasfs_read(polaris_mcp_console_attach_t)
telnet_use_ptys(polaris_mcp_console_attach_t)

# working with ioucon binary, invoked by usr/binos/conf/mcp_console_attach.sh
polaris_utility_domain_template(ioucon)
polaris_bexecute_domain(polaris_ioucon_t, polaris_ioucon_exec_t)

allow polaris_ioucon_t self:unix_dgram_socket create_socket_perms;
polaris_iosd_dgram_send(polaris_ioucon_t)
polaris_iosd_tmp_file_use(polaris_ioucon_t)
telnet_use_ptys(polaris_ioucon_t)

# "test platform hardware eobc ping" invokes eobc_ping.sh
# send sigchld when it is done
gen_require(
    type ping_t;
)

```

```

allow ping_t polaris_bexecute_t:process sigchld;
polaris_confd_domtrans(polaris_bexecute_t)

# app-hosting connect appid <> console/session
# Beluga/Meraki container
ifdef(`ms_platform',`
polaris_iox_container_domtrans(polaris_bexecute_t)
')

# Bottlenose/Meraki container
ifdef(`bottlenose_platform',`
polaris_iox_container_domtrans(polaris_bexecute_t)
')

# IOx downloads the application package using network protocol (e.g http)
gen_require(`
    type fifo_var_run_t;
')
allow polaris_bexecute_t fifo_var_run_t:fifo_file read;

# on vxe platforms with MBRv2/MBRv4/GPTv1/GPTv3 partition layouts
# /config is file system and export_mcp_environment tries to create it anyway
polaris_getattr_disk_config(polaris_bexecute_t)

#####
# This block is policies for
# "hw-module session <x/y>" CLI.
# It invokes usr/binos/conf/ngio_module_session.sh, eventually invoking
# open64.

polaris_utility_domain_template(ngio_module_session)
polaris_bexecute_domain(polaris_ngio_module_session_t, polaris_ngio_module_session_exec_t)
corecmd_exec_bin(polaris_ngio_module_session_t)
polaris_bexecute_domtrans(polaris_ngio_module_session_t)
term_use_unallocated_ttys(polaris_ngio_module_session_t)
dev_read_sysfs(polaris_ngio_module_session_t)
allow polaris_ngio_module_session_t self:process setsched;
auth_map_passwd(polaris_ngio_module_session_t)
polaris_chasfs_read(polaris_ngio_module_session_t)
polaris_cpld_read(polaris_ngio_module_session_t)
telnet_use_ptys(polaris_ngio_module_session_t)

# work with /tmp files
type polaris_ngio_module_session_tmp_t;
files_tmp_file(polaris_ngio_module_session_tmp_t)
manage_dirs_pattern(polaris_ngio_module_session_t, tmp_t, polaris_ngio_module_session_tmp_t)
manage_files_pattern(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t,
polaris_ngio_module_session_tmp_t)

```

```

manage_fifo_files_pattern(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t,
polaris_ngio_module_session_tmp_t)
files_tmp_filetrans(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t, { file dir })

# CLI: show platform software tech-support
# requires bshell execution
# /bin/bash /usr/binos/conf/bshell.sh -S -P ---- __CMD__ ---- -f
/usr/binos/conf/mcp_tech_support_command_file.txt
gen_require(
    type polaris_bshell_t;
    type polaris_bshell_exec_t;
)
domtrans_pattern(polaris_bexecute_t, polaris_bshell_exec_t, polaris_bshell_t)
# scripts stdin is set by hman and needs write/append access to pipes like pipe:[80159]
polaris_hman_use_fifo(polaris_bshell_t)
# in case of ISR4k show tech input for bshell dynamically created
polaris_tech_support_tmp_read(polaris_bshell_t)

# CLI: show software authenticity running
# this results in hman invoking below command:
# /bin/sh /usr/binos/conf/bexec.sh -c "/usr/bin/code_sign_verify show3 abcd "
polaris_code_verify_domtrans(polaris_bexecute_t)

# stdin is inherited when bexecute calls fts_client
polaris_fts_client_tmp_manage(polaris_bexecute_t)

# disk space full issue
allow polaris_platform_shell_t self:capability sys_resource;
#####
# CLI: request platform software sdwan admin-tech

# executes: /bin/sh vconfd_script_show_installerfs.sh
polaris_conf_unix_stream_stdio_use(polaris_bexecute_t)

# executes: bash bshell.sh -S -P ---- __CMD__ ---- -f /tmp/sdwan_tech_support_command_file_out.txt
polaris_conf_unix_stream_stdio_use(polaris_bshell_t)
#####

# write to /tmp/out_$(date "+%Y%m%d%H%M%S%N") for base version verification on smu install
polaris_install_tmp_write(polaris_bexecute_t)

# Nutella-XE install image
#/bin/bash /usr/binos/conf/brelay.sh -E -f rp 0 16023 -c /usr/binos/conf/install_engine.sh --operation install_commit
--isremote
polaris_conf_tmp_use_fifo(polaris_bexecute_t)

#awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/rp/0/0/rp_security/mount/.pkginfo
polaris_read_packages_conf(polaris_bexecute_t)

```

```

dev_read_rand(polaris_bexecute_t)

# /usr/bin/python3 /usr/binos/conf/issu_client_comp.py compare -b /usr/binos/conf/base_clients.txt -n
/bootflash/installer/current_clients.txt
polaris_disk_install_read(polaris_bexecute_t)

# allow "/usr/binos/conf/module_direct.py" (bexecute_t) to execute
# "/usr/sbin/ethtool" (ifconfig_exec_t) when invoking CLI
# "show platform1 hardware subslot <slot/card> backplane statistics"
sysnet_domtrans_ifconfig(polaris_bexecute_t)
# Write into pipe created by stack_mgr
# Parent Child Relation - stack_mgr -> mcp_trace_request -> brelay (to relay output to active)
optional_policy(
    polaris_use_stack_mgr_fifo(polaris_bexecute_t)
)

polaris_etc_list(polaris_bexecute_t)
#manage /tmp/existing_rommon_info file
polaris_manage_rommon_info(polaris_capsule_upgrade_t)

#Policies for "upgrade rom-monitor capsule primary switch 1 R0" CLI
#/usr/binos/conf/bexecute.sh -c /usr/binos/conf/cat9k-primary-capsule-upgrade.sh
#cat9k-primary-capsule-upgrade.sh have to run in its own domain

polaris_utility_domain_template(capsule_upgrade)

polaris_bootflash_manage(polaris_capsule_upgrade_t)

type polaris_capsule_upgrade_log_t;
polaris_pfile_type(polaris_capsule_upgrade_log_t)

polaris_capsule_upgrade_log_use(polaris_capsule_upgrade_t)

polaris_bexecute_domain(polaris_capsule_upgrade_t, polaris_capsule_upgrade_exec_t)

polaris_bexecute_domtrans(polaris_capsule_upgrade_t)
corecmd_exec_bin(polaris_capsule_upgrade_t)
auth_use_nsswitch(polaris_capsule_upgrade_t)
polaris_chasfs_manage(polaris_capsule_upgrade_t)
polaris_cpld_read(polaris_capsule_upgrade_t)
telnet_use_ptys(polaris_capsule_upgrade_t)

polaris_rommon_device_read(polaris_capsule_upgrade_t)

# For "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /usr/binos/conf/install_engine.sh

```

```

# --operation install_c",
# uses unix stream socket created by confd as standard I/O.
polaris_confd_unix_stream_stdio_use(polaris_chvrf_t)

#####
# mcp_dmesg_service
#####
polaris_utility_domain_template(mcp_dmesg)

polaris_bexecute_domain(polaris_mcp_dmesg_t, polaris_mcp_dmesg_exec_t)
polaris_bexecute_domtrans(polaris_mcp_dmesg_t)
dmesg_domtrans(polaris_mcp_dmesg_t)
corecmd_exec_bin(polaris_mcp_dmesg_t)
polaris_smand_use_fifo(polaris_mcp_dmesg_t)
auth_use_nsswitch(polaris_mcp_dmesg_t)
telnet_use_ptys(polaris_mcp_dmesg_t)

# allow creation/access of temporary files like /tmp/sh-thd-1608024622
type polaris_mcp_dmesg_tmp_t;
files_type(polaris_mcp_dmesg_tmp_t)
files_tmp_file(polaris_mcp_dmesg_tmp_t)
files_tmp_filetrans(polaris_mcp_dmesg_t, polaris_mcp_dmesg_tmp_t, file)
manage_files_pattern(polaris_mcp_dmesg_t, polaris_mcp_dmesg_tmp_t, polaris_mcp_dmesg_tmp_t)
fs_getattr_tmpfs(polaris_mcp_dmesg_t)

# allowing reload_fru.sh for doing systemctl list-jobs
systemd_config_generic_services(polaris_bexecute_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbexecute.te
No license file was found, but licenses were detected in source scan.

#
# July 2017, Victor Kamensky
#
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#

/dev/quack -c gen_context(system_u:object_r:polaris_quack_device_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisquack.fc
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#

```

```

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#

policy_module(polarisdbm, 1.0);

gen_require(
    type polaris_dbm_t;
)

#####
# mqipc manual, one that missing in platform tdl file
#####

ifdef(`nyquist_platform',`
gen_require(
    type polaris_bt_logger_dbm_mqipc_t;
)
# dbm may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_dbm_t, polaris_bt_logger_dbm_mqipc_t, bt_logger_dbm)
)

polaris_btrace_data_manage(polaris_dbm_t)
polaris_crft_data_manage(polaris_dbm_t)
polaris_chasfs_manage(polaris_dbm_t)
polaris_tdlresolve_read(polaris_dbm_t)
polaris_tdlldb_list_dirs(polaris_dbm_t)
polaris_cpld_read(polaris_dbm_t)
polaris_flashlib_read(polaris_dbm_t)

polaris_ripc_sman_ui_serv_connect(polaris_dbm_t)

polaris_db_tdlldb_dir_use(polaris_dbm_t)

polaris_libeiutil_build_config_directory(polaris_dbm_t)

polaris_cfg_data_manage(polaris_dbm_t)

allow polaris_dbm_t self:capability { sys_resource };
allow polaris_dbm_t self:process setrlimit;

# dbm listen on 9090 port; in case of ultra only in tcp6
corenet_tcp_bind_websm_port(polaris_dbm_t)

polaris_dyncfg_tmp_read(polaris_dbm_t)

allow polaris_dbm_t self:capability dac_override;

```

```

# port 9090, is it exclusively wnc_mgrd port?
corenet_tcp_bind_polaris_wnc_mgrd_port(polaris_dbm_t)
allow polaris_dbm_t self:tcp_socket {shutdown};

# working dbm persistent files in /bootflash/.dbpersist
type polaris_disk_dbm_t;
polaris_disk_type(polaris_disk_dbm_t)

polaris_tdlldbpersist_setup(polaris_dbm_t)

# dbm on active syncs with /bootflash/.dbpersist on standby
# related call dbm_persist_binary_cfg_sync_to_standby()
gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_dbm_t, rsync_t)

polaris_tmp_tdlldb_persist_setup(polaris_dbm_t)

logging_send_syslog_msg(polaris_dbm_t)

corecmd_exec_bin(polaris_dbm_t)

corecmd_exec_shell(polaris_dbm_t)

# dbm needs access to "/flash1/user/.installer/install_issu_state"
polaris_disk_install_read(polaris_dbm_t)

# runs over /usr/bin/rsync
corenet_tcp_connect_rsync_port(polaris_dbm_t)

# tar invocation in dbm code necessitates this permission
auth_map_passwd(polaris_dbm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbm.te
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#
# Sep 2020, Sridhar C
#
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#
/tmp/tlscd(/.*)? gen_context(system_u:object_r:polaris_tlscd_uds_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristlscd.fc

```

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```
#  
# March 2017, Victor Kamensky  
#  
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#  
  
/tmp/fp/lipc      -d gen_context(system_u:object_r:polaris_lipc_t,s0)  
/tmp/rp/lipc      -d gen_context(system_u:object_r:polaris_lipc_t,s0)  
/tmp/cc/lipc      -d gen_context(system_u:object_r:polaris_lipc_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislipc.fc
```

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```
#  
# April 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polarisdmincshdfwd, 1.0);
```

```
gen_require(  
    type polaris_dmi_ncsshd_fwd_t;  
)
```

```
polaris_btrace_data_manage(polaris_dmi_ncsshd_fwd_t)  
polaris_chasfs_manage(polaris_dmi_ncsshd_fwd_t)  
polaris_tdlresolve_read(polaris_dmi_ncsshd_fwd_t)  
polaris_tdlldb_list_dirs(polaris_dmi_ncsshd_fwd_t)  
polaris_cpld_read(polaris_dmi_ncsshd_fwd_t)  
polaris_flashlib_read(polaris_dmi_ncsshd_fwd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_dmi_ncsshd_fwd_t)
```

```
allow polaris_dmi_ncsshd_fwd_t self:unix_stream_socket create_stream_socket_perms;
```

```
type polaris_dmi_ncsshd_log_t;  
files_tmp_file(polaris_dmi_ncsshd_log_t)  
manage_files_pattern(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, polaris_dmi_ncsshd_log_t)  
manage_sock_files_pattern(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, polaris_dmi_ncsshd_log_t)  
files_tmp_filetrans(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, { file sock_file })
```

```
logging_send_syslog_msg(polaris_dmi_ncsshd_fwd_t)
```

```

polaris_cpuld_read(polaris_dmi_ncsshd_fwd_t)

# allow to execute execute_confid_cli.sh under confid domain
polaris_confid_domtrans(polaris_dmi_ncsshd_fwd_t)

# starts bexec.sh
polaris_bexecute_domtrans(polaris_dmi_ncsshd_fwd_t)
polaris_send_signal_to_bexecute(polaris_dmi_ncsshd_fwd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdfwd.te
No license file was found, but licenses were detected in source scan.

#
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#
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#

/usr/binos/conf/cyan_init\sh -- gen_context(system_u:object_r:polaris_dyncfg_exec_t,s0)
/usr/binos/conf/dyncfg_setup\sh -- gen_context(system_u:object_r:polaris_dyncfg_exec_t,s0)

# temp files created by cyan_init.sh
/tmp/cyan/cyan.log          gen_context(system_u:object_r:polaris_dyncfg_log_t,s0)
/tmp/cyan/cyan_runtime.log  gen_context(system_u:object_r:polaris_dyncfg_log_t,s0)

/tmp/cyan(/.*)?           gen_context(system_u:object_r:polaris_dyncfg_tmp_t,s0)
/tmp/cyan\lock             gen_context(system_u:object_r:polaris_dyncfg_tmp_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscyan.fc
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#
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#
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#

## <summary>Polaris bexecute Policy Rules.</summary>

#####
## <summary>
## Execute bexecute in the polaris_bexecute domain.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_bexecute_domtrans`,`
gen_require(`
type polaris_bexecute_t, polaris_bexecute_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_bexecute_exec_t, polaris_bexecute_t)
`)

```

```

#####
## <summary>
## Allow domain to be started by bexecute with
## transition into specific service domain.
## </summary>
## <param name="domain">
## <summary>
## Type to be used to run utility.
## </summary>
## </param>
## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
interface(`polaris_bexecute_domain`,`
gen_require(`
type polaris_bexecute_t;
`)

domtrans_pattern(polaris_bexecute_t, $2, $1)
`)

```

```

#####
## <summary>
## Execute mcp_chvrf.sh in the polaris_chvrf domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>

```

```

#
interface(`polaris_chvrf_domtrans`,`
  gen_require(`
    type polaris_chvrf_t, polaris_chvrf_exec_t;
  `)

  corecmd_search_bin($1)
  domtrans_pattern($1, polaris_chvrf_exec_t, polaris_chvrf_t)
`)

#####
## <summary>
##   Execute mcp_chvrf.sh in the caller domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_exec_chvrf`,`
  gen_require(`
    type polaris_chvrf_exec_t;
  `)

  corecmd_search_bin($1)
  can_exec($1, polaris_chvrf_exec_t)
`)

#####
## <summary>
## Execute ngio_module_session.sh in the polaris_ngio_module_session domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ngio_module_session_domtrans`,`
  gen_require(`
    type polaris_ngio_module_session_t, polaris_ngio_module_session_exec_t;
  `)

  corecmd_search_bin($1)
  domtrans_pattern($1, polaris_ngio_module_session_exec_t, polaris_ngio_module_session_t)
`)

```

```

#####
#####
## <summary>
## Allow the specified domain to send signals to any
## polaris process.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_send_signal_to_bexecute`,`
    gen_require(`
        type polaris_bexecute_t;
    `)

    allow $1 polaris_bexecute_t:process signal_perms;
)

#####
## <summary>
## Allow manage of polaris_bash_tmp_t.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bash_tmp_manage`,`
    gen_require(`
        type user_home_dir_t;
        type polaris_bash_tmp_t;
    `)

    manage_dirs_pattern($1, user_home_dir_t, polaris_bash_tmp_t)
    manage_files_pattern($1, polaris_bash_tmp_t, polaris_bash_tmp_t)
)

#####
## <summary>
## Execute bexecute in the polaris_bexecute domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>

```

```

## </param>
#
interface(`polaris_bconsole_domtrans`,`
gen_require(`
type polaris_bconsole_t, polaris_bconsole_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_bconsole_exec_t, polaris_bconsole_t)
`)

#####
## <summary>
## Send messages to ioucon unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ioucon_dgram_send`,`
gen_require(`
type polaris_ioucon_t;
`)

allow $1 polaris_ioucon_t:unix_dgram_socket sendto;
`)

#####
## <summary>
## Execute cat9k-primary-capsule-upgrade.sh , cat9k-capsule-upgrade.sh in its own domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_capsule_upgrade_domtrans`,`
gen_require(`
type polaris_capsule_upgrade_t, polaris_capsule_upgrade_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_capsule_upgrade_exec_t, polaris_capsule_upgrade_t)
`)

```

```
#####
## <summary>
##   Work(open,create,append,getattr) with /capsule-upgrade.log file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_capsule_upgrade_log_use`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_capsule_upgrade_log_t;
    `)
    allow $1 polaris_capsule_upgrade_log_t:filesystem getattr;

    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_capsule_upgrade_log_t, file, "capsule-upgrade.log")
    manage_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    create_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    getattr_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    append_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    allow $1 polaris_capsule_upgrade_log_t:file map;
`
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbexecute.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisobfl, 1.0);
```

```
#####
# Obfl policy
#####
```

```
type polaris_obfl_data_t;
files_type(polaris_obfl_data_t)
```

```
gen_require(`
    type init_t;
    type default_t;
```

```

    type tmp_t;
    attribute domain;
)

filetrans_pattern(domain, default_t, polaris_obfl_data_t, lnk_file, "obfl")
# edison uses obfl0 name
filetrans_pattern(domain, default_t, polaris_obfl_data_t, lnk_file, "obfl0")
# /tmp/obfl
files_tmp_filetrans(domain, polaris_obfl_data_t, dir, "obfl")

# allow obfl data file reside on persistent storage
polaris_pfile_type(polaris_obfl_data_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisobfl.te
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisbtlogger, 1.0);

gen_require(
    type polaris_bt_logger_t;
)

polaris_btrace_data_manage(polaris_bt_logger_t)
polaris_crft_data_manage(polaris_bt_logger_t)
polaris_chasfs_manage(polaris_bt_logger_t)
polaris_tdlresolve_read(polaris_bt_logger_t)
polaris_tdlldb_list_dirs(polaris_bt_logger_t)
polaris_cpld_read(polaris_bt_logger_t)
polaris_flashlib_read(polaris_bt_logger_t)

polaris_rpc_sman_ui_serv_connect(polaris_bt_logger_t)

polaris_db_tdlldb_dir_use(polaris_bt_logger_t)

#####
# mqipc manual, one that missing in platform tdl file
#####

# mq.-bt_logger_dbm
type polaris_bt_logger_dbm_mqipc_t;

```

```

polaris_mqipc_type(polaris_bt_logger_dbm_mqipc_t)

# mq.-bt_logger_fman-rp
type polaris_bt_logger_fman_rp_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_fman_rp_mqipc_t)

# mq.-bt_logger_iosd
type polaris_bt_logger_iosd_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_iosd_mqipc_t)

# mq.-bt_logger_smd
type polaris_bt_logger_smd_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_smd_mqipc_t)

polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_dbm_mqipc_t, bt_logger_dbm)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_fman_rp_mqipc_t, bt_logger_fman-rp)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_iosd_mqipc_t, bt_logger_iosd)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_smd_mqipc_t, bt_logger_smd)

allow polaris_bt_logger_t self:capability { dac_override };

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.te

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```

#
# November 2017, Victor Kamensky
#
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#

## <summary>Polaris gnmib Policy Rules.</summary>

```

```

#####
## <summary>
## Create rule for ndbutils file ".l.schema_use.gnmib" under /var/lock/ndbutil
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_gnmib_ndbutil_lock`,
    gen_require(`
        type polaris_confnd_ndbutil_lock_t;
        type polaris_gnmib_ndbutil_t;

```

```

    ')

filetrans_pattern($1, polaris_confd_ndbutil_lock_t, polaris_gnmib_ndbutil_t, file, $2)
manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_gnmib_ndbutil_t)

allow $1 polaris_gnmib_ndbutil_t:file { watch watch_reads };
')

#####
## <summary>
## Allow reading gnoi image files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_gnmib_gnoi_images_read`,`
    gen_require(`
        type polaris_gnmib_gnoi_images_t;
    `)

    read_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
    mmap_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
)

#####
## <summary>
## Allow manage gnoi image files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_gnmib_gnoi_images_manage`,`
    gen_require(`
        type polaris_gnmib_gnoi_images_t;
    `)

    manage_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
    mmap_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgnmib.if

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```
#
# March 2017, Victor Kamensky
#
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#

policy_module(polaristdldb, 1.0);

#####
# Polaris tdldb (infra/tllib)
#####
type polaris_tdldb_t;
polaris_tdldb_type(polaris_tdldb_t)

attribute polaris_tdldb;

# any process creating tdldb in /tmp/rp/tdldb should transition into its domain
gen_require(
    attribute domain;
)
files_tmp_filetrans(domain, polaris_tdldb_t, dir, "tdldb")

# DB_DIR database is not described in TDL
type polaris_dir_db_tdldb_t;
polaris_tdldb_type(polaris_dir_db_tdldb_t)

type polaris_tdldb_persist_t;
polaris_tdldb_type(polaris_tdldb_persist_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristdldb.te
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```

```
#
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#
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#

policy_module(polarislfts, 1.0);

#####
# Polaris lfts
#####
```

```

type polaris_lfts_device_t;
dev_node(polaris_lfts_device_t)

# "ip netns add foo" commands mounts "foo" under "/var/run/netns"
gen_require(
    type ifconfig_t;
    type var_run_t;
)
allow ifconfig_t var_run_t:dir mounton;

# "ip netns exec 16 sysctl -w net.core.vrfid=16" commands mounts "16" to "/sys"
gen_require(
    type ifconfig_t;
    type unlabeled_t;
)
allow ifconfig_t unlabeled_t:dir mounton;

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislfts.te
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```

```

#
# March 2017, Victor Kamensky
#
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#

/var/tmp/trace/nginx_access.log    gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx_error.log    gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.pid          gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.accept  gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.cookie_tbl gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.login_count gen_context(system_u:object_r:httpd_log_t, s0)
/tmp/nginx_aaa                    gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
/tmp/nginx_master                 gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
/tmp/nginx_session                gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)

#/tmp base folder for nginx apps to create temporary files.
/tmp/nginx_webui_tmp -d gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
/tmp/nginx -d gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)

# Polaris WebUI Aireos translator files
/usr/binos/conf/aireos_translate_helper.sh
gen_context(system_u:object_r:polaris_nginx_webui_aireos_translator_exec_t, s0)
/var/scripts/python/aireosConfigTranslator(/.*)? --
gen_context(system_u:object_r:polaris_aireos_translator_scripts_t,s0)

```

```
/var/scripts/webui_install.sh gen_context(system_u:object_r:polaris_nginx_webui_exec_t, s0)
/usr/binos/conf/webui_upgrade_helper.sh gen_context(system_u:object_r:polaris_nginx_webui_install_exec_t, s0)
/usr/binos/conf/webui_smu_helper.sh gen_context(system_u:object_r:polaris_nginx_webui_install_exec_t, s0)
/usr/binos/conf/ra_trace_webui_helper.sh
gen_context(system_u:object_r:polaris_nginx_webui_trace_filter_exec_t, s0)
/usr/binos/conf/nginx-conf gen_context(system_u:object_r:httpd_config_t, s0)
/usr/binos/conf/nginx-conf/servers gen_context(system_u:object_r:httpd_config_t, s0)

/tmp/fts_client gen_context(system_u:object_r:polaris_fts_client_tmp_t, s0)
/usr/binos/conf/nginx_helper.sh gen_context(system_u:object_r:polaris_nginx_helper_exec_t, s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnginx.fc
```

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```
#
# May 2017, Victor Kamensky
#
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#
```

```
policy_module(polarismdtpubd, 1.0);
```

```
gen_require(`
    type polaris_mdt_pubd_t;
`)
```

```
polaris_btrace_data_manage(polaris_mdt_pubd_t)
polaris_chasfs_manage(polaris_mdt_pubd_t)
polaris_tdlresolve_read(polaris_mdt_pubd_t)
polaris_tdldb_list_dirs(polaris_mdt_pubd_t)
polaris_cpld_read(polaris_mdt_pubd_t)
polaris_lua_read(polaris_mdt_pubd_t)
polaris_flashlib_read(polaris_mdt_pubd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_mdt_pubd_t)
```

```
polaris_db_tdldb_dir_use(polaris_mdt_pubd_t)
```

```
#For initializing capabilities DB cfg file
```

```
polaris_libeiutil_build_config_directory(polaris_mdt_pubd_t)
polaris_cfg_data_manage(polaris_mdt_pubd_t)
```

```
optional_policy(`
```

```
# deals with /dev/shm/confd setup (schema and pid)
```

```
polaris_conf_d_shm_setup(polaris_mdt_pubd_t)
```

```

# and allow read shared schema
polaris_conf_d_shared_schema_read(polaris_mdt_pubd_t)
# read /proc/confd_pid/exe file
polaris_conf_d_read(polaris_mdt_pubd_t)
')

# pubd could be configured to connect any port on DNAC
# please see cndp_setup_tcp_socket function
polaris_lfts_dev_use(polaris_mdt_pubd_t)
corenet_tcp_connect_all_ports(polaris_mdt_pubd_t)

polaris_ndbload_lock_use(polaris_mdt_pubd_t)

corenet_tcp_connect_polaris_pttcd_port(polaris_mdt_pubd_t)

corenet_tcp_bind_polaris_netconf_interceptor_port(polaris_mdt_pubd_t)
corenet_tcp_bind_all_unreserved_ports(polaris_mdt_pubd_t)

allow polaris_mdt_pubd_t self:capability { dac_override dac_read_search };

# create ndbutil directory under /var/lock
polaris_conf_d_ndbutil_create(polaris_mdt_pubd_t)

polaris_ndbutil_lock_template(polaris_mdt_pubd_t, pubd, ".l.schema_use.pubd")

# grpc library through sysconf accesses /sys/devices/system/cpu
# to get number of CPUs
dev_read_sysfs(polaris_mdt_pubd_t)

# handling /tmp/rp/.telemetry and /tmp/rp/telemetry
type polaris_mdt_pubd_tmp_t;
files_tmp_file(polaris_mdt_pubd_tmp_t)
files_tmp_filetrans(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, dir, "telemetry")
files_tmp_filetrans(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, dir, ".telemetry")
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_mdt_pubd_t, { tmp_t polaris_mdt_pubd_tmp_t }, polaris_mdt_pubd_tmp_t)
manage_files_pattern(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, polaris_mdt_pubd_tmp_t)

# from evconfd_dynamic_load
polaris_conf_d_shared_schema_watch(polaris_mdt_pubd_t)

# allow grpc library to shutdown socket
allow polaris_mdt_pubd_t self:tcp_socket create_socket_perms;

# allow pubd to access logging facility
logging_send_syslog_msg(polaris_mdt_pubd_t)

```

```

# enabling access to /etc/netns and /etc/hosts
polaris_namespace_set_netns_with_etc(polaris_mdt_pubd_t)
gen_require(
    type net_conf_t;
)
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, file, "hosts")
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, file, "resolv.conf")
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, dir, "netns")

# allow pubd to create, modify, delete system network config files/dir
sysnet_manage_config(polaris_mdt_pubd_t)
sysnet_manage_config_dirs(polaris_mdt_pubd_t)

# allow pubd to connect socket
allow polaris_mdt_pubd_t self:udp_socket connect;

# allow pubd (object net_conf_t) to watch /etc/netns/1/resolv.conf
allow polaris_mdt_pubd_t net_conf_t:{file dir} watch;

# read access to /dev/random
dev_read_rand(polaris_mdt_pubd_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_mdt_pubd_t)
polaris_tmp_tdlldb_persist_setup(polaris_mdt_pubd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.te
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#

# polarisstackmgr file contexts place holder

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.fc
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dnl
dnl Mar 2020, Manu Roy
dnl
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```

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dnl

dnl Hellcat Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/hellcatmaps.m4

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisperiodic, 1.0);

gen\_require(`

type polaris\_periodic\_t;

')

corecmd\_exec\_bin(polaris\_periodic\_t)

corecmd\_exec\_shell(polaris\_periodic\_t)

# allow to read /proc/meminfo

kernel\_read\_system\_state(polaris\_periodic\_t)

# allow read of /etc/passwd

auth\_use\_nsswitch(polaris\_periodic\_t)

# run ldd, which in turns execve "ld.so --verify"

libs\_exec\_ld\_so(polaris\_periodic\_t)

# read /etc/init.d/common-utility-functions

init\_read\_script\_files(polaris\_periodic\_t)

fs\_getattr\_all\_fs(polaris\_periodic\_t)

# work with /tmp files

type polaris\_periodic\_tmp\_t;

files\_tmp\_file(polaris\_periodic\_tmp\_t)

manage\_files\_pattern(polaris\_periodic\_t, tmp\_t, polaris\_periodic\_tmp\_t)

files\_tmp\_filetrans(polaris\_periodic\_t, polaris\_periodic\_tmp\_t, file)

allow polaris\_periodic\_t self:capability sys\_resource;

```

polaris_btrace_data_manage(polaris_periodic_t)
polaris_chasfs_manage(polaris_periodic_t)
polaris_cpuld_read(polaris_periodic_t)
polaris_proc_rmonbifo_read(polaris_periodic_t)
polaris_rmonbifo_tmp_read(polaris_periodic_t)
polaris_boot_tmp_read(polaris_periodic_t)
polaris_read_debug_conf(polaris_periodic_t)
polaris_persistent_manage(polaris_periodic_t)

# reads /tmp/issu_proc
polaris_install_tmp_read(polaris_periodic_t)

optional_policy(
polaris_ncd_tmp_read(polaris_periodic_t)
)
# "install add file" CLI triggers logger sending syslog messages
logging_send_syslog_msg(polaris_periodic_t)
# "install add file" CLI triggers logger executing "pidof linux_iosd-image" which
# read "/sys/devices/system/cpu/online"
dev_read_sysfs(polaris_periodic_t)
#
# /usr/bin/conf/cleanup.sh do_cleanup does packages and other umount calls
mount_domtrans(polaris_periodic_t)
polaris_sw_data_manage(polaris_periodic_t)

# determine if the installer is executing
domain_read_all_domains_state(polaris_periodic_t)

# access to /cdrom0/ when *ova image is booted during
# first instance of vwlc on ucs server
polaris_removable_read(polaris_periodic_t)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisperiodic.te
```

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```

#
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#
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#

```

```

/tmp/pm_post_result -- gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_tmp_t,s0)
/tmp/microcode_update(/.*)? gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_tmp_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcp1fmmgr.fc

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#

# February 2020, Victor Kamensky

#

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#

policy\_module(polarisfpm, 1.0);

gen\_require(`

    type polaris\_fpm\_t;

`)

polaris\_chasfs\_manage(polaris\_fpm\_t)

polaris\_cpld\_read(polaris\_fpm\_t)

polaris\_flashlib\_read(polaris\_fpm\_t)

polaris\_tdlresolve\_read(polaris\_fpm\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_fpm\_t)

polaris\_db\_tdlb\_dir\_use(polaris\_fpm\_t)

logging\_send\_syslog\_msg(polaris\_fpm\_t)

# vconfd\_load\_shared\_schemas

polaris\_conf\_d\_shared\_schema\_read(polaris\_fpm\_t)

# /var/run/.fpm socket and pid

type polaris\_fpm\_var\_run\_t;

files\_pid\_file(polaris\_fpm\_var\_run\_t)

manage\_files\_pattern(polaris\_fpm\_t, polaris\_fpm\_var\_run\_t, polaris\_fpm\_var\_run\_t)

manage\_sock\_files\_pattern(polaris\_fpm\_t, polaris\_fpm\_var\_run\_t, polaris\_fpm\_var\_run\_t)

files\_pid\_filetrans(polaris\_fpm\_t, polaris\_fpm\_var\_run\_t, { file sock\_file })

polaris\_ttm\_var\_sock\_write(polaris\_fpm\_t)

# fp\_scaling\_init calls posix\_sysconf

dev\_read\_sysfs(polaris\_fpm\_t)

# PLEASE LOOK AT ME: write access to /boot/hugepage.conf

# which on ultra translates into /varied/hugepage.conf access

# But no code in polaris uses it

polaris\_disk\_varied\_manage(polaris\_fpm\_t)

files\_manage\_boot\_files(polaris\_fpm\_t)

polaris\_cedge\_tmpfs\_manage(polaris\_fpm\_t)

```

polaris_fmrp2fpm_mqipc_use(polaris_fpm_t)

# manually create mqipc channel: missing in TDL
type polaris_fpm2fmrp_mqipc_t;
polaris_mqipc_type(polaris_fpm2fmrp_mqipc_t)
polaris_mqipc_create_name(polaris_fpm_t, polaris_fpm2fmrp_mqipc_t, fpm2fmrp_vulcan_mqipc)

# fp_scaling_read_core_count accesses cgroups file at
# /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_fpm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfpm.te
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dnl
dnl April 2018, Victor Kamensky
dnl
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dnl
divert(-1)

include(`polaris_process.m4')
include(`polaris_process_te.m4')

include(`polaris_ipc_mqipc.m4')
include(`polaris_ipc_mqipc_te.m4')

include(`polaris_ipc_ripc.m4')
include(`polaris_ipc_ripc_te.m4')

include(`polaris_ipc_lipc.m4')
include(`polaris_ipc_lipc_te.m4')

dnl Stub out non existent one
define(`polaris_websocket_service_server',`)
define(`polaris_cipc_service_server',`)

include(`polaris_max_scope.m4')

divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
policy_module(polarisplatformipcauto, 1.0);

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_te.m4

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#

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#

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#

## <summary>Polaris polarisbhytoolsd Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.if

No license file was found, but licenses were detected in source scan.

#

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#

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#

/tmp/tdlresolve\_tmp(/.\*)? gen\_context(system\_u:object\_r:polaris\_tdlresolve\_t,s0)

/tmp/tdlresolve(/.\*)? gen\_context(system\_u:object\_r:polaris\_tdlresolve\_t,s0)

/usr/binos/conf/global.service.conf -- gen\_context(system\_u:object\_r:polaris\_global\_service\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdlresolve.fc

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#

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#

## <summary>Polaris ttm Policy Rules.</summary>

#####

## <summary>

## Write ttm /var/run socket file

## </summary>

## <param name="domain">

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ttm_var_sock_write`,`
    gen_require(`
        type polaris_ttm_t;
        type polaris_ttm_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_ttm_var_run_t)
    allow $1 polaris_ttm_t:unix_stream_socket { connectto };
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristtm.if

No license file was found, but licenses were detected in source scan.

```

#
# April 2017, Victor Kamensky
#
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#
## <summary>Polaris CYAN Policy Rules.</summary>

```

```
#####
```

```

## <summary>
## Execute dyncfg in the dyncfg domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_dyncfg_domtrans`,`
    gen_require(`
        type polaris_dyncfg_t, polaris_dyncfg_exec_t;
    `)
)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_dyncfg_exec_t, polaris_dyncfg_t)
)

```

```
#####
## <summary>
##   Make the specified domain able to read tmp file created by
## cyan_init.sh like /tmp/cyan/mono.cdb
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dynconfg_tmp_read`,`
    gen_require(`
        type polaris_dynconfg_tmp_t;
        type tmp_t;
    `)

    read_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    read_lnk_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    allow $1 polaris_dynconfg_tmp_t:file map;

    # need by shell that is called from luajit script
    auth_read_passwd($1)
)

#####
## <summary>
##   Make the specified domain able to manage tmp file created by
## cyan_init.sh like /tmp/cyan.lock
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dynconfg_tmp_manage`,`
    gen_require(`
        type polaris_dynconfg_tmp_t;
        type tmp_t;
    `)

    manage_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    manage_lnk_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    allow $1 polaris_dynconfg_tmp_t:file map;
)

#####
```

```

## <summary>
##   Execute /tmp/dyncfg/N intialization within given domain.
##
##   Effectively one need this if it needs to run dyncfg_db_run_init_script,
##   dyncfg_db_init functions within domain context.
##
##   Note it involves lua execution that leads to execmem. Also lua script
##   may execve shell and some other simple bin processes like mkdir or ln.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dyncfg_setup`,`
    gen_require(`
        type polaris_dyncfg_tmp_t;
        type tmp_t;
    `)
    files_tmp_filetrans($1, polaris_dyncfg_tmp_t, dir, "cyan")
    manage_dirs_pattern($1, polaris_dyncfg_tmp_t, polaris_dyncfg_tmp_t)
    manage_files_pattern($1, { tmp_t polaris_dyncfg_tmp_t }, polaris_dyncfg_tmp_t)
    manage_lnk_files_pattern($1, { tmp_t polaris_dyncfg_tmp_t }, polaris_dyncfg_tmp_t)
    allow $1 polaris_dyncfg_tmp_t:file map;

    # dyncfg_setup calls luajit and luajit needs execute JIT generated code
    allow $1 self:process execmem;

    # LOOK AT ME lua initialization code still uses system function call do some
    # trivial things like mkdir. But because of that we need to grant shell and
    # bin access to all callers of
    corecmd_exec_shell($1)
    corecmd_exec_bin($1)

    # In chassis_attrs.lua method THIS.WIRELESS checks whether wireless package is installed
    # by opening (why open, not stat) wncmgrd binary.
    optional_policy(`
        gen_require(`
            type polaris_wncmgrd_exec_t;
            type bin_t;
        `)
        read_files_pattern($1, bin_t, polaris_wncmgrd_exec_t)
    `)

    # lua code reads /tmp/sw/boot/rmonbifo/boardtype
    polaris_rmonbifo_tmp_read($1)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscyan.if

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polariscppcp, 1.0);

gen\_require(^

    type polaris\_cpp\_cp\_t;

')

polaris\_btrace\_data\_manage(polaris\_cpp\_cp\_t)

polaris\_crft\_data\_manage(polaris\_cpp\_cp\_t)

polaris\_chasfs\_manage(polaris\_cpp\_cp\_t)

polaris\_tdlresolve\_read(polaris\_cpp\_cp\_t)

polaris\_tdlldb\_list\_dirs(polaris\_cpp\_cp\_t)

polaris\_cpld\_read(polaris\_cpp\_cp\_t)

polaris\_flashlib\_read(polaris\_cpp\_cp\_t)

polaris\_rpc\_sman\_ui\_serv\_connect(polaris\_cpp\_cp\_t)

polaris\_db\_tdlldb\_dir\_use(polaris\_cpp\_cp\_t)

polaris\_cpp\_process(polaris\_cpp\_cp\_t)

polaris\_cpp\_dev\_use(polaris\_cpp\_cp\_t)

polaris\_icc\_broken\_relocations(polaris\_cpp\_cp\_t)

logging\_send\_syslog\_msg(polaris\_cpp\_cp\_t)

polaris\_cpp\_cavium\_sdk\_ipc\_use(polaris\_cpp\_cp\_t)

# LOOK AT ME: raw memory access in cavium vendor SDK

# related to octeon driver (BUG CSCvh58515)

ifdef(^crankshaft\_family',`

polaris\_dev\_mem\_use(polaris\_cpp\_cp\_t)

')

# cpp\_palci\_wallock\_time\_ticks function reads /var/lock/subsys/sntp.offset

files\_read\_all\_locks(polaris\_cpp\_cp\_t)

```
# allow objstore access
polaris_disk_objstore_read(polaris_cpp_cp_t)
```

```
optional_policy(`
polaris_spa_dev_use(polaris_cpp_cp_t)
`)
```

```
# handle geodb file access
polaris_geodb_files_manage(polaris_cpp_cp_t)
```

```
optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_cp_t)
```

```
polaris_hkp_dev_use(polaris_cpp_cp_t)
# Access /dev/astro
polaris_astro_dev_use(polaris_cpp_cp_t)
polaris_vega_dev_use(polaris_cpp_cp_t)
`)
polaris_cpp_tmpfs_manage(polaris_cpp_cp_t)
polaris_cpld_dev_use(polaris_cpp_cp_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcp.te

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```
#
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#
```

```
policy_module(polariscppstats, 1.0);
```

```
gen_require(`
    type polaris_cpp_stats_t;
`)
```

```
polaris_btrace_data_manage(polaris_cpp_stats_t)
polaris_crft_data_manage(polaris_cpp_stats_t)
polaris_chasfs_manage(polaris_cpp_stats_t)
polaris_tdlresolve_read(polaris_cpp_stats_t)
polaris_tdlldb_list_dirs(polaris_cpp_stats_t)
polaris_cpld_read(polaris_cpp_stats_t)
polaris_flashlib_read(polaris_cpp_stats_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_cpp_stats_t)
```

```

polaris_cpp_tmp_files_use(polaris_cpp_stats_t)
# works with /dev/cpp_dev_info, /dev/cpp and /dev/cpp_kipc
polaris_cpp_dev_use(polaris_cpp_stats_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_cpp_stats_t)

polaris_icc_broken_relocations(polaris_cpp_stats_t)

# get attributes of /dev/shm from glibc where_is_shmfs function
fs_getattr_tmpfs(polaris_cpp_stats_t)

optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_stats_t)
')
polaris_cpp_tmpfs_manage(polaris_cpp_stats_t)
polaris_cpld_dev_use(polaris_cpp_stats_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppstats.te
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisl, 1.0);

gen_require(`
    type polaris_lm_t;
')

polaris_btrace_data_manage(polaris_lm_t)
polaris_crft_data_manage(polaris_lm_t)
polaris_chasfs_manage(polaris_lm_t)
polaris_tdlresolve_read(polaris_lm_t)
polaris_tdlldb_list_dirs(polaris_lm_t)
polaris_cpld_read(polaris_lm_t)
polaris_flashlib_read(polaris_lm_t)

polaris_ripc_sman_ui_serv_connect(polaris_lm_t)

allow polaris_lm_t self:capability { dac_override };

# allow to read /proc/mtd
kernel_read_system_state(polaris_lm_t)

```

```
# work with /tmp files (/tmp/iosd_level)
type polaris_lm_tmp_t;
files_tmp_file(polaris_lm_tmp_t)
files_tmp_filetrans(polaris_lm_t, polaris_lm_tmp_t, file, "iosd_level")
files_tmp_filetrans(polaris_lm_t, polaris_lm_tmp_t, file, "stack_apcount")
manage_files_pattern(polaris_lm_t, tmp_t, polaris_lm_tmp_t)
```

```
polaris_dynconf_tmp_read(polaris_lm_t)
```

```
polaris_disk_license_manage(polaris_lm_t)
```

```
polaris_disk_csl_manage(polaris_lm_t)
```

```
logging_send_syslog_msg(polaris_lm_t)
```

```
polaris_lua_read(polaris_lm_t)
# permission to access /tmp/rp/lipc/lmanrtu_stackrtu_socket
# polaris_lm_t policy
allow polaris_lm_t self:unix_stream_socket connectto;
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislm.te

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```
#
# August 2017, Victor Kamensky
#
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#
```

```
/usr/binos/conf/flash_check.sh -- gen_context(system_u:object_r:polaris_flashcheck_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.fc

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarislipc, 1.0);
```

```
#####
```

```

# LIPC policy
#####
gen_require(
    type polaris_pvp_t;
    attribute polaris_extended_domain;
)

type polaris_lipc_t;
files_type(polaris_lipc_t)

files_tmp_filetrans(polaris_extended_domain, polaris_lipc_t, dir, "lipc")
init_script_tmp_filetrans(polaris_extended_domain, polaris_lipc_t, dir, "lipc")

# in some cases pvp.sh creates lipc tmp directory it needs permissions for that
manage_dirs_pattern(polaris_pvp_t, tmp_t, polaris_lipc_t)

gen_require(
    attribute polaris_extended_domain;
    type polaris_pvp_tmp_t;
)
filetrans_pattern(polaris_extended_domain, polaris_pvp_tmp_t, polaris_lipc_t, dir, "lipc")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislipc.te

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```

#
# September 2018, Anubha Balani
#
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#

```

## <summary>Polaris Memory Service Policy Rules.</summary>

```

#####
# Polaris memory: libmaroon and such
#####

```

```

#####
## <summary>
## Allow the specified domain to check existence of
## /lib/systemd/system/ksm.service file. Effectively checking
## whether KSM kernel feature is enabled on device or not.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.

```

```

## </summary>
## </param>
#
interface('polaris_ksm_run_check',`
    gen_require(`
        type systemd_unit_file_t;
    `)

    getattr_files_pattern($1, systemd_unit_file_t, systemd_unit_file_t)
)

#####
## <summary>
## Manage temporary maroon files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface('polaris_maroon_data_manage_all',`

    gen_require(`
        attribute polaris_maroon_data_domain;
        type polaris_maroon_base_t;
    `)

    manage_files_pattern($1, polaris_maroon_base_t, polaris_maroon_data_domain)
    allow $1 polaris_maroon_data_domain:file map;

    # manage temporary files in maroon_stats directory
    manage_files_pattern($1, polaris_maroon_base_t, polaris_maroon_base_t)
)

#####
## <summary>
## Make the specified type usable as maroon data file type.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
interface('polaris_maroon_data_type',`
    files_type($1)
)

```

```

gen_require(
    attribute polaris_maroon_data_domain;
)
typeattribute $1 polaris_maroon_data_domain;
)

#####
## <summary>
##   Process to manage its own maroon files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="file_type">
##   <summary>
##     File type of maroon that corresponds to given domain.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_maroon_data_client`,`
gen_require(
type polaris_maroon_base_t;
)

manage_files_pattern($1, polaris_maroon_base_t, $2)
allow $1 $2:file map;
filetrans_pattern($1, polaris_maroon_base_t, $2, file)
)

#####
## <summary>
##   Process to manage its own maroon files
## </summary>
## <param name="domain_stem">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_maroon_data_client_template`,`
gen_require(
type polaris_maroon_base_t;
)

```

```
type polaris_$1_maroon_t;
polaris_maroon_data_type(polaris_$1_maroon_t)

polaris_maroon_data_client(polaris_$1_t, polaris_$1_maroon_t)
')
```

```
#####
```

```
## <summary>
##   Getattr of polaris_zram_device_t files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_zram_getattr',`
    gen_require(`
        type device_t;
        type polaris_zram_device_t;
    `)
    getattr_blk_files_pattern($1, device_t, polaris_zram_device_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismemory.if
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
/bootflash/.dbpersist(/.*)?      gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbm.fc
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```

```
#
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#
```

```

policy_module(polarisreflector, 1.0);

polaris_process_domain_template(reflector)

corecmd_exec_bin(polaris_reflector_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_reflector_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_reflector_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_reflector_t)

# read /etc/hosts file
sysnet_read_config(polaris_reflector_t)

# work with /tmp files
type polaris_reflector_tmp_t;
files_tmp_file(polaris_reflector_tmp_t)
manage_dirs_pattern(polaris_reflector_t, tmp_t, polaris_reflector_tmp_t)
manage_files_pattern(polaris_reflector_t, polaris_reflector_tmp_t, polaris_reflector_tmp_t)
manage_fifo_files_pattern(polaris_reflector_t, polaris_reflector_tmp_t, polaris_reflector_tmp_t)
files_tmp_filetrans(polaris_reflector_t, polaris_reflector_tmp_t, { file dir })

# reflector can work with droputil tmp files
polaris_droputil_manage_tmp_files(polaris_reflector_t)

#rsync_exec(polaris_reflector_t)
gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_reflector_t, rsync_t)
allow rsync_t polaris_reflector_t:process sigchld;
# upon exec rsync inherits reflector.sh stdout/stderr which are
# polaris_reflector_t fifo_files
allow rsync_t polaris_reflector_t:fifo_file write;

allow polaris_reflector_t self:capability { sys_resource dac_override };
allow polaris_reflector_t self:process setpgid;

polaris_btrace_data_manage(polaris_reflector_t)
polaris_cpld_read(polaris_reflector_t)
polaris_chasfs_manage(polaris_reflector_t)
polaris_boot_tmp_read(polaris_reflector_t)
polaris_read_debug_conf(polaris_reflector_t)

```

```

polaris_disk_crashinfo_getattr(polaris_reflector_t)
polaris_rmonbifo_tmp_read(polaris_reflector_t)

# watch over /tmp/rp/dropbox
polaris_droputil_tmp_watch(polaris_reflector_t)

# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
optional_policy(
polaris_ncd_tmp_read(polaris_reflector_t)
')

# 'rm -rf /tmp/rp/reflector'
fs_getattr_tmpfs(polaris_reflector_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisreflector.te
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#
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#
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#

policy_module(polarispman, 1.0);

polaris_process_domain_template(pman)

#reassess all permissions granted here for new pman
# - do we clone this domain to pman, or replace it?

gen_require(
type polaris_psvp_t;
    type polaris_pvp_t;
)

corecmd_exec_bin(polaris_pman_t)
corecmd_exec_shell(polaris_pman_t)
# can execute process in polaris domain
polaris_exec(polaris_pman_t)

# LOOK AT ME start-stop-daemon from busy box iterates all
# /proc/<pid> directories and reads /proc/<pid>/cmdline
# /proc/<pid>/exe. I.e it need quite a bit of priviledges
domain_read_all_domains_state(polaris_pman_t)

# pman wants to write to /proc/<pid>/oom_adj of each process

```

```

# it started. Now oom_adj is under label of process that owns
# it, so for now let pman to be able to write into any file
# in polaris_domain. Latter try to clean it up by transitioning
# oom_adj into separate domain?
gen_require(
    attribute polaris_domain;
)
manage_files_pattern(polaris_pman_t, polaris_domain, polaris_domain)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_pman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pman_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_pman_t)

# read /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_pman_t)

# read/write cgroups files
fs_rw_cgroup_files(polaris_pman_t)

dmidecode_domtrans(polaris_pman_t)

allow polaris_pman_t self:capability { sys_nice sys_resource dac_override sys_rawio sys_admin };

polaris_btrace_data_manage(polaris_pman_t)
polaris_chasfs_manage(polaris_pman_t)
polaris_cpld_read(polaris_pman_t)
ifdef(^ngwc_family',`
polaris_cpld_write(polaris_pman_t)
)`
)
polaris_proc_rmonbifo_read(polaris_pman_t)
polaris_rmonbifo_tmp_read(polaris_pman_t)
polaris_boot_tmp_read(polaris_pman_t)
polaris_read_debug_conf(polaris_pman_t)
polaris_disk_crashinfo_getattr(polaris_pman_t)

# work with /tmp files
type polaris_pman_tmp_t;
files_tmp_file(polaris_pman_tmp_t)
manage_dirs_pattern(polaris_pman_t, tmp_t, polaris_pman_tmp_t)
manage_files_pattern(polaris_pman_t, polaris_pman_tmp_t, polaris_pman_tmp_t)
manage_fifo_files_pattern(polaris_pman_t, polaris_pman_tmp_t, polaris_pman_tmp_t)
files_tmp_filetrans(polaris_pman_t, polaris_pman_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_pman_tmp_t, dir, "process")

```

```

filetrans_pattern(domain, tmp_t, polaris_pman_tmp_t, dir, "pman_ports")

# pcohort reads files in /tmp/rp/process directory
gen_require(
    attribute polaris_extended_domain;
)
read_files_pattern(polaris_extended_domain, polaris_pman_tmp_t, polaris_pman_tmp_t)
list_dirs_pattern(polaris_extended_domain, polaris_pman_tmp_t, polaris_pman_tmp_t)

# bash needs setpgid in its make_child function
allow polaris_pman_t self:process { setpgid };

# pmanlite uses getsid
allow polaris_pman_t self:process { getsession };

# pman call renice utility to change process nice level
allow polaris_pman_t self:process { setsched };

# pman needs to work with pvp tmp files
polaris_pvp_manage_tmp_files(polaris_pman_t)

# on ultra pman waits for /tmp/cpp_ifdev_rep pipes appearance before
# proceeding further before it starts iosd
optional_policy(
polaris_cpp_tmp_ifdev_getattr(polaris_pman_t)

# /tmp/vxe_ucose_image created by some systemd units and accessed
# by pman, lets transition it into polaris_pman_tmp_t domain
gen_require(
    type initrc_t;
    type init_t;
)
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "vxe_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "wlc_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "utah_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "fugazi_ucose_image")
)
# pman needs to manage cgroups membership of dofferent processes
# See move_to_cgroup pman function. It needs setsched permission
domain_setpriority_all_domains(polaris_pman_t)

# pman.sh can call logger command
logging_send_syslog_msg(polaris_pman_t)

# pman can receive signals from any polaris domain process
polaris_receive_signal_from_domain(polaris_pman_t)

# pman.sh calls pidof command (similar to ps)

```

```

# pidof needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_pman_t)
# pidof commands wants sys_ptrace
allow polaris_pman_t self:capability sys_ptrace;

# pman can send signal to anything
domain_signal_all_domains(polaris_pman_t)

# pmanlite can getpgid to its child group processes
domain_getpgid_all_domains(polaris_pman_t)

# pmanlite uses killpg(<child pid>,SIGNULL) to test its child processes
domain_signull_all_domains(polaris_pman_t)

term_use_unallocated_ttys(polaris_pman_t)

optional_policy(`
polaris_repm_tmp_manage(polaris_pman_t)
`)

optional_policy(`
# pman on nyquist ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_pman_t)
`)

# runs find over /proc
kernel_getattr_proc(polaris_pman_t)

# PLEASE LOOK AT ME: pman removes /tmp/subpkg directory after CSCvm14562 commit
# back out and change properly after CSCvm51181 is fixed
polaris_install_tmp_manage(polaris_pman_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_pman_t)
fs_getattr_xattr_fs(polaris_pman_t)

# domain for gdbserver started by pman

polaris_utility_domain_template(gdb)

domtrans_pattern(polaris_pman_t, polaris_gdb_exec_t, polaris_gdb_t)

# pman starts gdbserver with stdout pointing to btrace fifo
polaris_use_btrace_fifo(polaris_gdb_t)

# gdbserver reads /proc/$pid/exe of a process it gets attached to.
# Allow to read state of all processes for now.
domain_read_all_domains_state(polaris_gdb_t)

```

```

# allow gdbserver to bind to all unreserved ports for now
corenet_tcp_bind_unreserved_ports(polaris_gdb_t)
corenet_tcp_bind_generic_node(polaris_gdb_t)

allow polaris_gdb_t self:process { ptrace setpgid };
allow polaris_gdb_t self:tcp_socket { accept bind create getattr listen setopt };

# pman update iosxe_control_processes/iosxe_mgmt_processes/tasks
fs_manage_cgroup_dirs(polaris_pman_t)
fs_manage_cgroup_files(polaris_pman_t)

optional_policy(`
container_runtime_domtrans(polaris_pman_t)
`)

# pman calls show_version for dockerd executable
optional_policy(`
polaris_container_runtime_show_version(polaris_pman_t)
`)

# needs to access nsfs file during killall invocation
fs_read_nsfs_files(polaris_pman_t)

#runs over /proc/<pid>/net/arp
kernel_read_network_state(polaris_pman_t)

#runs over /proc/<pid>/net/stat
kernel_read_network_state_symlinks(polaris_pman_t)

#runs over /proc/<pid>/net/rpc
kernel_read_rpc_sysctls(polaris_pman_t)

# LOOK AT ME: why pman doing it
# from mgmt/confd/confd/src/confd_startup_sh_post_exit.sh archive_errlog function
polaris_btrace_persistent_data_manage(polaris_pman_t)
polaris_confd_log_manage(polaris_pman_t)
allow polaris_pman_t self:process setfscreate;

# access /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_pman_t)

# /usr/binos/conf/umbrella_init.sh that runs under pman
# copies into /bootflash/ios_core.p7b
polaris_bootflash_manage(polaris_pman_t)

optional_policy(`
# we may write bits to the exiting_bays file in /proc

```

```

polaris_rw_exiting_bays(polaris_pman_t)
')

ifdef(^ngwc_family',`
# linux_iosd_image_post_exit.sh restores the slot-based address
# for the management ethernet should be restored on dual RP system.
polaris_chvrf_domtrans(polaris_pman_t)
sysnet_domtrans_ifconfig(polaris_pman_t)

# For use of flashutil preparing for reload
polaris_flashlib_read(polaris_pman_t)
polaris_flashlib_write(polaris_pman_t)
')

# File description leaks for TDL db lock files as processes are managed by
# pman.
# TODO Eventually these fd leaks should be fixed in the calling processes
#
# Note that TDL db lock file interfaces are typically generated by TDL and
# are not found in our local .if files
polaris_tdlresolve_read(polaris_pman_t)
polaris_db_tdlldb_ios_oper_use(polaris_pman_t)

ifdef(^nyquist_platform',`
polaris_db_tdlldb_ewlc_operational_use(polaris_pman_t)
polaris_db_tdlldb_rogued_use(polaris_pman_t)
polaris_db_tdlldb_ewlc_config_use(polaris_pman_t)
polaris_db_tdlldb_wstatsd_use(polaris_pman_t)
polaris_db_tdlldb_client_global_use(polaris_pman_t)
')

# delete /tmp/booted from linux_iosd_image_post_exit.sh when iosd goes down.
# For example: preparing for reload.
gen_require(
    type polaris_iosd_tmp_files_t;
)
allow polaris_pman_t polaris_iosd_tmp_files_t:file { delete_file_perms open };

# Upon exit of a process, pman needs to remove sai directory and files
# associated with the process
polaris_pvp_delete_sai_files(polaris_pman_t)
#rsync port want to establish Tcp connection
#runs over /usr/bin/rsync
corenet_tcp_connect_rsync_port(polaris_pman_t)
rsync_entry_type(polaris_pman_t)

ifdef(^crankshaft_family',`
# Provide process signal perms to pman.

```

```

polaris_caf_proc_signal_perms(polaris_pman_t)
')

# open connections from processes managed by pman can leak. The selinux
# errors associated with these typically come from a forked and renamed
# elastic process like wncd_0. During process forking/startup, node
# binds may cause denials as they are brought up by pman
ifdef(`ngwc_family',`
corenet_tcp_bind_generic_node(polaris_pman_t)
corenet_udp_bind_generic_node(polaris_pman_t)
corenet_tcp_connect_lisp_cons_control_port(polaris_pman_t)
')

# pman can stop itself on reload
allow polaris_pman_t self:capability kill;

# For pmanlite, allow pman's grand-children rsync to be able to operate on pipe created by pman.
gen_require(`
    type rsync_t;
')
polaris_use_pman_fifo(rsync_t)

ifdef(`sumatra_platform',`
# Allow pman to execute cman_fp in the polaris_cm_fp_t domain
polaris_cm_fp_domtrans(polaris_pman_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispman.te

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`fp', `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 0)

```
max_elastic_map_set(`cc', `elastic', BPROC_WNCD, 0)
max_elastic_map_set(`fp', `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/nyquistmaps.m4
No license file was found, but licenses were detected in source scan.
```

```
#
# Aug 2020, Sridhar
#
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#

## <summary>Polaris xcopy Policy Rules.</summary>

#####
## <summary>
##   Execute xcopy related scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_xcopy_script_domtrans',`
    gen_require(`
        type polaris_xcopy_script_t, polaris_xcopy_script_exec_t;
    ')

    domtrans_pattern($1, polaris_xcopy_script_exec_t, polaris_xcopy_script_t)
')
#
#####
## <summary>
##   xcopy progress temp file access
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_xcopy_tmp_manage',`
    gen_require(`
        type polaris_xcopy_tmp_t;
```

```
)  
  manage_dirs_pattern($1,polaris_xcopy_tmp_t, polaris_xcopy_tmp_t)  
  manage_files_pattern($1,polaris_xcopy_tmp_t, polaris_xcopy_tmp_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisxcopy.if  
No license file was found, but licenses were detected in source scan.
```

```
#  
# April 2017, Victor Kamensky  
#  
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#  
## <summary>Polaris dmi_ncsshd_mgmt Policy Rules.</summary>  
  
#####  
## <summary>  
##   Read polaris_ncsshd_keys_t files, effectively access  
##   /tmp/.ncsshd_authorized_keys created by psd and read by ncssh  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
#  
interface(`polaris_ncsshd_authorized_keys_read`,`  
  gen_require(`  
    type polaris_ncsshd_keys_t;  
  `)  
  read_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)  
  list_dirs_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)  
)  
  
#####  
## <summary>  
##   Watch /var/run/netns and list contents  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
#  
interface(`polaris_watch_netns`,`
```

```

gen_require(
    type ifconfig_var_run_t;
)
list_dirs_pattern($1, ifconfig_var_run_t, ifconfig_var_run_t)
allow $1 ifconfig_var_run_t:dir watch;
)

#####
## <summary>
##   Manage polaris_pttcd_tmp_t files, effectively files
##   under /tmp/tmpub/interceptor
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_interceptor_manage',`
    gen_require(
        type polaris_pttcd_tmp_t;
    )
    manage_files_pattern($1, polaris_pttcd_tmp_t, polaris_pttcd_tmp_t)
    manage_dirs_pattern($1, polaris_pttcd_tmp_t, polaris_pttcd_tmp_t)
    allow $1 polaris_pttcd_tmp_t:{ dir file } watch;
)

#####
## <summary>
##   Execute a domain transition to run ncsshd polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncsshd_mgmt_domtrans',`
    gen_require(
        type polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_exec_t;
    )

    domtrans_pattern($1, polaris_dmi_ncsshd_mgmt_exec_t, polaris_dmi_ncsshd_mgmt_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdmgmt.if

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```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris cm_rp Policy Rules.</summary>

#####
## <summary>
## Execute cmand_fp in the polaris_cm_fp_t domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cm_rp_domtrans',`
gen_require(`
type polaris_cm_rp_t, polaris_cm_rp_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_cm_rp_exec_t, polaris_cm_rp_t)
')

#####
## <summary>
## Write into fifo file created by cmrp, typical case when
## cmrp starts script under popen.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_cmrp_use_fifo',`
gen_require(`
type polaris_cm_rp_t;
`)

write_fifo_files_pattern($1, polaris_cm_rp_t, polaris_cm_rp_t)
```

```

')

#####
## <summary>
##   Write/read /tmp/pfu_overtime.lock file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cm_rp_tmp_manage',`
    gen_require(`
        type polaris_cm_rp_tmp_t;
        type tmp_t;
    `)
    manage_dirs_pattern($1, { tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
    manage_files_pattern($1,{ tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
)

#####
## <summary>
##   Setup policies to access dir and file
##   /vol/harddisk/.inv/inv_log_file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cm_rp_inv_log_setup',`
    gen_require(`
        type polaris_cm_rp_inv_log_file_t;
        type polaris_disk_harddisk_t;
        type polaris_disk_bootflash_t;
    `)
    filetrans_pattern($1, {polaris_disk_harddisk_t polaris_disk_bootflash_t}, polaris_cm_rp_inv_log_file_t, dir,
".inv")
    # allow access to /vol/harddisk/.inv
    manage_dirs_pattern($1, {polaris_disk_harddisk_t polaris_disk_bootflash_t}, polaris_cm_rp_inv_log_file_t)
    # allow access to /vol/harddisk/.inv/inv_log_file
    manage_files_pattern($1,{polaris_cm_rp_inv_log_file_t}, polaris_cm_rp_inv_log_file_t)
)

#####
## <summary>

```

```

## Write into /tmp/codesign.txt file created by cm_rp
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cm_rp_tmp_write',`
    gen_require(`
        type polaris_cm_rp_tmp_t;
    `)
    write_files_pattern($1, { tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmrp.if
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```

```

#
# February 2020, Victor Kamensky
#
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#

policy_module(polarisvdaemon, 1.0);

gen_require(`
    type polaris_vdaemon_t;
`)
polaris_chasfs_manage(polaris_vdaemon_t)
# read and write /bootflash/sdwan/etc/vdaemon_gen_id
polaris_bootflash_manage(polaris_vdaemon_t)
polaris_tdlresolve_read(polaris_vdaemon_t)
polaris_cpld_read(polaris_vdaemon_t)
polaris_flashlib_read(polaris_vdaemon_t)

polaris_rpc_sman_ui_serv_connect(polaris_vdaemon_t)

polaris_db_tdlb_dir_use(polaris_vdaemon_t)

logging_send_syslog_msg(polaris_vdaemon_t)

# vconfd_load_shared_schemas
polaris_conf_d_shared_schema_read(polaris_vdaemon_t)

# manage /etc/viptela

```

```

polaris_cedge_etc_manage(polaris_vdaemon_t)

polaris_cedge_reset_ns(polaris_vdaemon_t)

# calls ifconfig for tun_0_0 interface
sysnet_domtrans_ifconfig(polaris_vdaemon_t)

# calls dmidecode get system serial number
dmidecode_domtrans(polaris_vdaemon_t)

# /var/run/.vdaemon socket and pid
type polaris_vdaemon_var_run_t;
files_pid_file(polaris_vdaemon_var_run_t)
manage_files_pattern(polaris_vdaemon_t, polaris_vdaemon_var_run_t, polaris_vdaemon_var_run_t)
manage_sock_files_pattern(polaris_vdaemon_t, polaris_vdaemon_var_run_t, polaris_vdaemon_var_run_t)
files_pid_filetrans(polaris_vdaemon_t, polaris_vdaemon_var_run_t, { file sock_file })

polaris_ttm_var_sock_write(polaris_vdaemon_t)

# generate_instance_uuid reads /sys/devices/virtual/dmi/id/product_uuid
dev_read_sysfs(polaris_vdaemon_t)

# vip_util_set_fd_limits calls setrlimit
allow polaris_vdaemon_t self:process { setrlimit setpgid };

allow polaris_vdaemon_t self:capability { dac_override fowner sys_resource };

# vdaemon_init_tunn_intf initialize tun_0_0 in vrf 1
allow polaris_vdaemon_t self:tun_socket create;
corenet_rw_tun_tap_dev(polaris_vdaemon_t)

polaris_persistent_watch(polaris_vdaemon_t)
# from vdaemon_misc.c vdaemon_init_inotify function
polaris_cedge_etc_watch(polaris_vdaemon_t)

# set_netns_with_etc mounts on / and /sys
# set_netns_with_etc opens /etc/netns/1 dir
polaris_namespace_set_netns_with_etc(polaris_vdaemon_t)
# DNS thread complains about tmp_t mounton
# on /sys when switching namespace
gen_require(
    type tmp_t;
)
allow polaris_vdaemon_t tmp_t:dir mounton;

# vip_util_set_ns opens /var/run/netns/*
polaris_cedge_set_ns(polaris_vdaemon_t)
# vip_dns_process_request switches namespace from linux n/w namespace to

```

```

# original mount namespace
allow polaris_vdaemon_t self:capability { net_admin sys_chroot };
allow polaris_vdaemon_t self:udp_socket { bind connect create getattr getopt setopt shutdown };

# control linux routes vip_route_delete and vdaemon_setup_system_ip_route
allow polaris_vdaemon_t self:netlink_route_socket { bind create getattr nlmsg_read nlmsg_write };

# binds to vbond udp ports
corenet_udp_bind_generic_node(polaris_vdaemon_t)
corenet_udp_bind_polaris_vbond_port(polaris_vdaemon_t)

# though default ports exist, users can configure the tcp ports in vManage and vSmart
corenet_tcp_connect_all_ports(polaris_vdaemon_t)

# vbond_proc_hello executes VIP_CDB_BACKUP_SCRIPT
polaris_conf_d_domtrans(polaris_vdaemon_t)
# VIP_CDB_BACKUP_SCRIPT makes use of /etc/confd/confd_ipc_secret
auth_map_passwd(polaris_vdaemon_t)

# vdaemon_write_authorized_keys_to_ncsshd opens VDAEMON_NCSSHD_AUTH_KEY_FILE file
polaris_ncsshd_keys_manage(polaris_vdaemon_t)
# vbond_encode_version opens /etc/version
polaris_confd_etc_read(polaris_vdaemon_t)

# generate_or_parse_uuid() invokes uuid_generate that needs read on
# random-number generator devices (e.g., /dev/random).
dev_read_rand(polaris_vdaemon_t)

# vdaemon_exec_iptables() is invoked by vdaemon all over the place
iptables_domtrans(polaris_vdaemon_t)

allow polaris_vdaemon_t self:capability net_raw;
allow polaris_vdaemon_t self:rawip_socket create_socket_perms;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.te
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#
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#
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#

## <summary>Polaris fman_rp Policy Rules.</summary>

#####

```

```

## <summary>
##   Manage mqipc fmrp2fpm shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fmrp2fpm_mqipc_use`,
gen_require(`
type polaris_fmrp2fpm_mqipc_t;
`)
polaris_mqipc_use($1, polaris_fmrp2fpm_mqipc_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.if

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```

dnl
dnl May 2019
dnl
dnl Copyright (c) 2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
dnl confined and permissive domain maps
divert(-1)
define(`permissive_domain', `defn(format(``permissive_domain[%s]", ` $1'))')
define(`permissive_domain_set', `define(format(``permissive_domain[%s]", ` $1'), ` $2'))

define(`confined_domain', `defn(format(``confined_domain[%s]", ` $1'))')
define(`confined_domain_set', `define(format(``confined_domain[%s]", ` $1'), ` $2'))

dnl
dnl list of all subjects that should be in confined mode
dnl
confined_domain_set(`polaris_iosd_t', `polaris_iosd_t')

dnl
dnl list of all subjects that should be placed in permissive mode
dnl
permissive_domain_set(`polaris_nginx_t', `polaris_nginx_t')
permissive_domain_set(`polaris_nginx_webui_t', `polaris_nginx_webui_t')
permissive_domain_set(`polaris_nginx_webui_install_t', `polaris_nginx_webui_install_t')

```

divert(0)dnl

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/domainmaps.m4

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

/tmp/dbgmn\_log\_svr gen\_context(system\_u:object\_r:polaris\_fed\_sock\_t,s0)

/tmp/fed\_post\_result -- gen\_context(system\_u:object\_r:polaris\_fed\_tmp\_t,s0)

/flash/shfwd\_params.txt gen\_context(system\_u:object\_r:polaris\_disk\_bootflash\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisrollbacktimer, 1.0);

polaris\_process\_domain\_template(rbtimer)

corecmd\_exec\_bin(polaris\_rbtimer\_t)

# allow to read /proc/meminfo

kernel\_read\_system\_state(polaris\_rbtimer\_t)

# allow read of /etc/passwd

auth\_use\_nsswitch(polaris\_rbtimer\_t)

# run ldd, which in turns execve "ld.so --verify"

libs\_exec\_ld\_so(polaris\_rbtimer\_t)

# work with /tmp files

type polaris\_rbtimer\_tmp\_t;

files\_tmp\_file(polaris\_rbtimer\_tmp\_t)

```

manage_dirs_pattern(polaris_rbtimer_t, tmp_t, polaris_rbtimer_tmp_t)
manage_files_pattern(polaris_rbtimer_t, polaris_rbtimer_tmp_t, polaris_rbtimer_tmp_t)
manage_fifo_files_pattern(polaris_rbtimer_t, polaris_rbtimer_tmp_t, polaris_rbtimer_tmp_t)
files_tmp_filetrans(polaris_rbtimer_t, polaris_rbtimer_tmp_t, { file dir })

# work with /bootflash/.rollback_timer (RBT_CONTROL_DIR) file
type polaris_rbtimer_bootflash_t;
polaris_disk_type(polaris_rbtimer_bootflash_t)
polaris_rbtimer_bootflash_manage(polaris_rbtimer_t)

allow polaris_rbtimer_t self:capability sys_resource;
allow polaris_rbtimer_t self:capability dac_override;
allow polaris_rbtimer_t self:process setpgid;

polaris_btrace_data_manage(polaris_rbtimer_t)
polaris_chasfs_manage(polaris_rbtimer_t)
polaris_cpld_read(polaris_rbtimer_t)
polaris_boot_tmp_read(polaris_rbtimer_t)
polaris_read_debug_conf(polaris_rbtimer_t)
polaris_proc_rmonbifo_read(polaris_rbtimer_t)
polaris_rmonbifo_tmp_read(polaris_rbtimer_t)
polaris_disk_crashinfo_getattr(polaris_rbtimer_t)
polaris_disk_harddisk_read_lnk(polaris_rbtimer_t)
polaris_bootflash_manage(polaris_rbtimer_t)

logging_send_syslog_msg(polaris_rbtimer_t)

# uses pidof
domain_read_all_domains_state(polaris_rbtimer_t)
dev_read_sysfs(polaris_rbtimer_t)

#rollbacktimer runs install_engine.sh
polaris_install_engine_domtrans(polaris_rbtimer_t)

polaris_script_errmsg_use(polaris_rbtimer_t)

# watch over /bootflash/.rollback_timer
allow polaris_rbtimer_t polaris_rbtimer_bootflash_t:dir watch;
# watch over /tmp/rp/rollback_timer
allow polaris_rbtimer_t polaris_rbtimer_tmp_t:dir watch;

# access to /tmp/ufs//crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_rbtimer_t)
`)
# access to read packages.conf
polaris_read_packages_conf(polaris_rbtimer_t)

```

# access to /cdrom0/ when \*ova image is booted during

# first instance of vwlc on ucs server

polaris\_removable\_read(polaris\_rbtimer\_t)

# access to "/bootflash/.installer/install\_abort\_timer\_val"

polaris\_disk\_install\_read(polaris\_rbtimer\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.te

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisbhytoolsd, 1.0);

polaris\_process\_domain\_template(bhytoolsd)

polaris\_btrace\_data\_manage(polaris\_bhytoolsd\_t)

polaris\_chasfs\_manage(polaris\_bhytoolsd\_t)

polaris\_cpld\_read(polaris\_bhytoolsd\_t)

# vmttoolsd transtions from polaris\_bhytoolsd\_t to vmttools\_t -

# bhytoolsd is small wrapper that calls vmttoolsd

vmttools\_domtrans(polaris\_bhytoolsd\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.te

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#

# August 2017, Shawn Lu

#

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#

policy\_module(polarismobilityd, 1.0);

gen\_require(`

type polaris\_mobilityd\_t;

`)

polaris\_btrace\_data\_manage(polaris\_mobilityd\_t)

```
polaris_crft_data_manage(polaris_mobilityd_t)
polaris_chasfs_manage(polaris_mobilityd_t)
polaris_tdlresolve_read(polaris_mobilityd_t)
polaris_tdlldb_list_dirs(polaris_mobilityd_t)
polaris_cpld_read(polaris_mobilityd_t)
polaris_lua_read(polaris_mobilityd_t)
polaris_flashlib_read(polaris_mobilityd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_mobilityd_t)
```

```
polaris_db_tdlldb_dir_use(polaris_mobilityd_t)
```

```
# allow to use setrlimit
```

```
allow polaris_mobilityd_t self:capability sys_resource;
```

```
allow polaris_mobilityd_t self:process setrlimit;
```

```
allow polaris_mobilityd_t self:capability dac_override;
```

```
allow polaris_mobilityd_t self:udp_socket { create_socket_perms recv_msg send_msg };
```

```
logging_send_syslog_msg(polaris_mobilityd_t)
```

```
polaris_lfts_dev_use(polaris_mobilityd_t)
```

```
polaris_cpld_read(polaris_mobilityd_t)
```

```
polaris_odm_clnt2svr_mqipc_create(polaris_mobilityd_t)
```

```
polaris_tmp_tdlldb_persist_setup(polaris_mobilityd_t)
```

```
polaris_tdlldbpersist_setup(polaris_mobilityd_t)
```

```
corenet_udp_bind_generic_node(polaris_mobilityd_t)
```

```
corenet_udp_bind_polaris_mobility_ctl_port(polaris_mobilityd_t)
```

```
corenet_udp_bind_polaris_mobility_data_port(polaris_mobilityd_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismobilityd.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/usr/binos/conf/wui-lighttpd-launch.sh -- gen_context(system_u:object_r:polaris_webui_lighttpd_exec_t,s0)
```

```
/usr/binos/conf/wui-app-launch.sh -- gen_context(system_u:object_r:polaris_webui_exec_t,s0)
```

```
/usr/binos/conf/wui-tipc-launch.sh -- gen_context(system_u:object_r:polaris_webui_exec_t,s0)
```

```
/webui(/.*)? gen_context(system_u:object_r:polaris_webui_file_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswebui.fc
```

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```
#
```

```
# April 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/tmp/.DmiAuth\.socket -s gen_context(system_u:object_r:polaris_dmi_dmiauthd_tmp_t,s0)
```

```
/tmp/netconf-yang-diag(/.*)? gen_context(system_u:object_r:polaris_dmi_dmiauthd_tmp_diags_t,s0)
```

```
/usr/binos/conf/dmid_diag_logs.sh -- gen_context(system_u:object_r:polaris_dmid_diag_logs_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.fc
```

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```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
# polarisrrmmgr file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.fc
```

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```
#
```

```
# May 2017, Victor Kamensky
```

```
#
```

```
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```

```
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```

```
#
```

```
## <summary>Polaris pttcd Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.if
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
/usr/binos/conf/oom.sh -- gen_context(system_u:object_r:polaris_oom_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoom.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
# July 2020, Swati Kumari  
#  
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#
```

```
policy_module(polarisptpdrp, 1.0);
```

```
gen_require(  
    type polaris_ptpd_rp_t;  
)  
polaris_chasfs_read(polaris_ptpd_rp_t)  
polaris_cpld_read(polaris_ptpd_rp_t)  
polaris_tdlresolve_read(polaris_ptpd_rp_t)  
polaris_lsmapi_dev_use(polaris_ptpd_rp_t)
```

```
# ptpd needs to have open,read,write access with /dev/ds31408  
polaris_ds31408_dev_use(polaris_ptpd_rp_t)
```

```
# blzi device  
polaris_blzi_dev_use(polaris_ptpd_rp_t)
```

```
allow polaris_ptpd_rp_t self:capability sys_nice;  
allow polaris_ptpd_rp_t self:process setsched;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisptpdrp.te  
No license file was found, but licenses were detected in source scan.
```

```
#  
# March 2017, Victor Kamensky  
#
```

```

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#

/tmp/lsn.log -- gen_context(system_u:object_r:polaris_epc_ws_liaison_tmp_t,s0)

/tmp/epc_ws(/.*)? gen_context(system_u:object_r:polaris_epc_ws_liaison_tmp_t,s0)

# CLI: show platform software wireshark
/usr/bin/os/conf/wireshark_show.sh -- gen_context(system_u:object_r:polaris_wireshark_show_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisepcwsliasion.fc
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#
# July 2017, Victor Kamensky
#
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#

policy_module(polarisgsdrp, 1.0);

gen_require(
    type polaris_gsd_rp_t;
)

#allow to run readlink /dev/loop0 & /bin/date
corecmd_exec_bin(polaris_gsd_rp_t)

#run ldd, which in turn exec "ld.so --verify"
libs_exec_ld_so(polaris_gsd_rp_t)

# allow to run mount in its own domain
mount_domtrans(polaris_gsd_rp_t)
# awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_gsd_rp_t)
polaris_btrace_data_manage(polaris_gsd_rp_t)
polaris_chasfs_manage(polaris_gsd_rp_t)
polaris_read_debug_conf(polaris_gsd_rp_t)
polaris_disk_crashinfo_getattr(polaris_gsd_rp_t)
polaris_guestshell_exec_files_exec(polaris_gsd_rp_t)
polaris_guestshell_files_read(polaris_gsd_rp_t)
polaris_ncd_tmp_read(polaris_gsd_rp_t)
polaris_proc_rmonbifo_read(polaris_gsd_rp_t)
polaris_cpld_read(polaris_gsd_rp_t)
polaris_bootflash_read(polaris_gsd_rp_t)

```

```

polaris_harddisk_read(polaris_gsd_rp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_gsd_rp_t)

auth_use_nsswitch(polaris_gsd_rp_t)
polaris_rmonbifo_tmp_read(polaris_gsd_rp_t)

allow polaris_gsd_rp_t self:capability { dac_override sys_resource };
allow polaris_gsd_rp_t self:process setpgid;

type polaris_gsd_rp_tmp_t;
files_tmp_file(polaris_gsd_rp_tmp_t)
manage_dirs_pattern(polaris_gsd_rp_t, tmp_t, polaris_gsd_rp_tmp_t)
manage_files_pattern(polaris_gsd_rp_t, tmp_t, polaris_gsd_rp_tmp_t)
manage_fifo_files_pattern(polaris_gsd_rp_t, polaris_gsd_rp_tmp_t, polaris_gsd_rp_tmp_t)
# work with /tmp/guestshell_stk directory
files_tmp_filetrans(polaris_gsd_rp_t, polaris_gsd_rp_tmp_t, dir, "guestshell_stk")

gen_require(^
    type rsync_t;
)
rsync_entry_domtrans(polaris_gsd_rp_t, rsync_t)
allow rsync_t polaris_gsd_rp_t:process sigchld;

# read /opt/cisco/caf directory
polaris_caf_files_read(polaris_gsd_rp_t)

gen_require(^
    type polaris_caf_api_port_t;
    type polaris_caf_exec_t;
)
allow polaris_gsd_rp_t polaris_caf_api_port_t:tcp_socket name_connect;
allow polaris_gsd_rp_t polaris_caf_exec_t:file { getattr open read };
allow polaris_gsd_rp_t tmp_t:dir { create rmdir };

polaris_flashlib_read(polaris_gsd_rp_t)
polaris_flashlib_write(polaris_gsd_rp_t)

# watch over /tmp/udev/etc/udev
polaris_udev_tmp_read(polaris_gsd_rp_t)
polaris_udev_tmp_watch(polaris_gsd_rp_t)
# watch over /bootflash/gs_script
polaris_persistent_watch(polaris_gsd_rp_t)
#allow iox_ha_utils.sh to read /etc/docker/daemon.json.
gen_require(^
    type container_config_t;
)

```

```
read_files_pattern(polaris_gsd_rp_t, container_config_t, container_config_t)
```

```
# allow guestshell_ha.sh to log messages  
logging_send_syslog_msg(polaris_gsd_rp_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#  
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#
```

```
## <summary>Polaris Rmonbifo Policy Rules.</summary>
```

```
#####  
# Polaris Rmonbifo Driver policy  
#####
```

```
#####
```

```
## <summary>  
## Read /proc/rmbonbifo files.  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>
```

```
#  
interface(`polaris_proc_rmonbifo_read`,  
gen_require(  
type polaris_proc_rmonbifo_t;  
)  
read_files_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)  
list_dirs_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)  
)
```

```
#####
```

```
## <summary>  
## Getattr of /proc/rmbonbifo files.  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>
```

```

## </param>
#
interface(`polaris_proc_rmonbifo_getattr`,`
gen_require(`
type polaris_proc_rmonbifo_t;
`)
setattr_files_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)
`)

#####
## <summary>
## Read /tmp/sw/boot/rmonbifo files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_rmonbifo_tmp_read`,`
gen_require(`
type polaris_rmonbifo_tmp_t;
type polaris_boot_tmp_t;
`)
read_files_pattern($1, polaris_rmonbifo_tmp_t, polaris_rmonbifo_tmp_t)
# /tmp/sw/boot/rmonbifo dir is inside of polaris_boot_tmp_t dir
search_dirs_pattern($1, polaris_boot_tmp_t, polaris_rmonbifo_tmp_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.if
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#
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#
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#

/usr/binos/conf/ncd.sh -- gen_context(system_u:object_r:polaris_ncd_exec_t,s0)
/etc/conf/unifieddfs/mount_data gen_context(system_u:object_r:polaris_ncd_etc_t,s0)

/usr/binos/conf/iosd_console_attach.sh -- gen_context(system_u:object_r:polaris_console_attach_exec_t,s0)

/usr/binos/conf/unifieddfs/unifieddfs_helper.sh -- gen_context(system_u:object_r:polaris_ufs_helper_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisncd.fc

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#

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#

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#

## <summary>Polaris iosd Policy Rules.</summary>

#####

## <summary>

## Make the specified domain able to work with /tmp/restconf

## </summary>

## <param name="type">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_restconf\_tmp\_use`,`

gen\_require(`

type polaris\_restconf\_tmp\_t;

`)

manage\_files\_pattern(\$1, polaris\_restconf\_tmp\_t, polaris\_restconf\_tmp\_t)

manage\_dirs\_pattern(\$1, polaris\_restconf\_tmp\_t, polaris\_restconf\_tmp\_t)

')

#####

## <summary>

## Create domain for IOSD Polaris processes. Note

## depending on policy build setting it could be confined or

## not confined

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <param name="entry\_point">

## <summary>

## Type of the program to be used as an entry point to this domain.

## </summary>

```

## </param>
#
interface(`polaris_iosd_domain`,`
    polaris_process_domain_confined($1, $2)

    polaris_iosd_maybe_unconfined($1)
`)

#####
## <summary>
##   Make the specified domain able to work with iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iosd2iox_tmp_manage`,`
    gen_require(`
        type polaris_iosd2iox_tmp_t;
    `)

    manage_files_pattern($1, polaris_iosd2iox_tmp_t, polaris_iosd2iox_tmp_t)
`)

#####
## <summary>
##   Make the specified domain able to read iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iosd2iox_tmp_read`,`
    gen_require(`
        type polaris_iosd2iox_tmp_t;
    `)

    read_files_pattern($1,polaris_iosd2iox_tmp_t,polaris_iosd2iox_tmp_t)
`)

#####
## <summary>
## Send messages to iosd unix datagram sockets.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iosd_dgram_send`,`
gen_require(`
type polaris_iosd_t;
`)

allow $1 polaris_iosd_t:unix_dgram_socket sendto;
`)

#####
## <summary>
## Make the specified domain to read /tmp/rp/.iosp_dmiauthd
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dmiauthd_token_read`,`
gen_require(`
type polaris_dmiauthd_token_t;
`)

read_files_pattern($1, polaris_dmiauthd_token_t, polaris_dmiauthd_token_t)
`)

#####
## <summary>
## Make the specified domain to read /tmp/rp/.iosp_gnmib
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_gnmib_token_read`,`
gen_require(`
type polaris_gnmib_token_t;
`)

manage_files_pattern($1, polaris_gnmib_token_t, polaris_gnmib_token_t)
`)

```

)

#####

## <summary>

## Make the specified domain able to work with files

## with polaris\_iosd\_tmp\_files\_t

## </summary>

## <param name="type">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_iosd\_tmp\_file\_use`,`

gen\_require(`

type polaris\_iosd\_tmp\_files\_t;

`)

manage\_files\_pattern(\$1, polaris\_iosd\_tmp\_files\_t, polaris\_iosd\_tmp\_files\_t)

allow \$1 polaris\_iosd\_tmp\_files\_t:sock\_file { manage\_sock\_file\_perms};

)

#####

## <summary>

## Manage /bootflash/geodb/ files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <rolebase/>

#

interface(`polaris\_geodb\_files\_manage`,`

gen\_require(`

type polaris\_geodb\_files\_t;

`)

manage\_files\_pattern(\$1, polaris\_geodb\_files\_t, polaris\_geodb\_files\_t)

manage\_dirs\_pattern(\$1, polaris\_geodb\_files\_t, polaris\_geodb\_files\_t)

manage\_lnk\_files\_pattern(\$1, polaris\_geodb\_files\_t, polaris\_geodb\_files\_t)

)

#####

## <summary>

## Allow the specified domain to read /boot/vcpu\_template.txt

## or /csl\_p\_0/vcpu\_template.txt

## </summary>

```

## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iosd_vcpu_read`,`
    gen_require(`
        type polaris_iosd_vcpu_t;
        type polaris_disk_varied_t;
        type polaris_disk_csl_p_t;
    `)

    read_files_pattern($1, { polaris_disk_varied_t polaris_disk_csl_p_t }, polaris_iosd_vcpu_t)
)

#####
## <summary>
## Allow the specified domain to read /tmp/usb-disable
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iosd_usb_disable_tmp_manage`,`
    gen_require(`
        type polaris_iosd_usb_disable_tmp_t;
    `)

    manage_files_pattern($1, polaris_iosd_usb_disable_tmp_t, polaris_iosd_usb_disable_tmp_t)
    files_tmp_filetrans($1, polaris_iosd_usb_disable_tmp_t, file, "usb-disable")
)

#####
## <summary>
## Allow the specified domain to access /bootflash/EFI
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_efi_files_list_dirs`,`
    gen_require(`
        type polaris_efi_files_t;

```

```
)  
  
list_dirs_pattern($1, polaris_efi_files_t, polaris_efi_files_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiosd.if  
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```

```
#  
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#
```

```
# polarissmd file contexts place holder
```

```
# dc_profile_dir  
/mnt/sd3/user/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)  
/flash1/user/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)  
/bootflash/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmd.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
# polarismqipc file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismqipc.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
# July 2017, Victor Kamensky  
#  
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#
```

```
## <summary>Polaris iomd Policy Rules.</summary>
```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/ngio[0-9+] devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ngio_dev_use`,`
gen_require(`
    type device_t;
    type polaris_ngio_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_ngio_device_t)
    read_chr_files_pattern($1, device_t, polaris_ngio_device_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiomd.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisrepm, 1.0);
```

```
gen_require(`
    type polaris_repm_t;
`)
```

```
polaris_btrace_data_manage(polaris_repm_t)
polaris_crft_data_manage(polaris_repm_t)
polaris_chasfs_manage(polaris_repm_t)
polaris_tdlresolve_read(polaris_repm_t)
polaris_tdlldb_list_dirs(polaris_repm_t)
polaris_cpld_read(polaris_repm_t)
polaris_lua_read(polaris_repm_t)
polaris_flashlib_read(polaris_repm_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_repm_t)
```

```

polaris_db_tdlldb_dir_use(polaris_repm_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_repm_t)

allow polaris_repm_t self:capability { sys_resource dac_override };
allow polaris_repm_t self:process setrlimit;

# temporary files created for repm in /tmp/replication
type polaris_repm_tmp_t;
files_tmp_file(polaris_repm_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_repm_tmp_t, dir, "replication")
manage_files_pattern(polaris_repm_t, polaris_repm_tmp_t, polaris_repm_tmp_t)

polaris_dyncfg_tmp_read(polaris_repm_t)

polaris_tdlldbpersist_setup(polaris_repm_t)

polaris_tmp_tdlldb_persist_setup(polaris_repm_t)

# send syslog
logging_send_syslog_msg(polaris_repm_t)

# mq.-local_rp_1_0
type polaris_repm_local_rp_mqipc_t;
polaris_mqipc_type(polaris_repm_local_rp_mqipc_t)

polaris_mqipc_create_name(polaris_repm_t, polaris_repm_local_rp_mqipc_t, local_rp_1_0)
polaris_mqipc_create_name(polaris_repm_t, polaris_repm_local_rp_mqipc_t, local_rp_0_0)

# repm peer mqipc queues under /dev/shm/repm_peer_mq folder
type polaris_repm_peer_mqipc_t;
polaris_mqipc_type(polaris_repm_peer_mqipc_t)
polaris_mqipc_create_name_dir(polaris_repm_t, polaris_repm_peer_mqipc_t, repm_peer_mq)

# repm invokes installer_api_* api's which need access to /bootflash/.installer/install_issu_state
polaris_install_disk_read(polaris_repm_t)

ifdef(^petra_platform',
#allow access to polaris_cm_rp sem for chasfs
polaris_cm_rp_sem_use(polaris_repm_t)
#allow access to /flash12/moncfg/cfg.dat for config
polaris_swipedrive_file_manage(polaris_repm_t)

')

# execute /bin/tar
corecmd_exec_bin(polaris_repm_t)

```

```
# tar reads /etc/passwd
auth_use_nsswitch(polaris_repm_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrepm.te
No license file was found, but licenses were detected in source scan.
```

```
#
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#
```

```
## <summary>Polaris NGWC Platform Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
##   Manage ngwc shared memory /dev/shm/ngwc_shm.
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ngwc_shm_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_ngwc_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_ngwc_shm_t)
    allow $1 polaris_ngwc_shm_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_ngwc_shm_t, file, "ngwc_shm")
`)
```

```
#####
```

```
## <summary>
```

```
##   Manage ngwc shared memory /dev/shm/ngwc_scc_shm.
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ngwc_scc_shm_manage`,`
```

```

gen_require(
    type tmpfs_t;
    type polaris_ngwc_scc_shm_t;
)
fs_getattr_tmpfs($1)
manage_files_pattern($1, tmpfs_t, polaris_ngwc_scc_shm_t)
allow $1 polaris_ngwc_scc_shm_t:file map;
filetrans_pattern($1, tmpfs_t, polaris_ngwc_scc_shm_t, file, "ngwc_scc_shm")
)

```

```
#####
```

```

## <summary>
##   Manage ngwc shared memory /dev/shm/iomd_to_fed_ptp_offload.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface('polaris_ngwc_itfpo_manage',`
    gen_require(
        type tmpfs_t;
        type polaris_ngwc_itfpo_t;
    )
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_ngwc_itfpo_t)
    allow $1 polaris_ngwc_itfpo_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_ngwc_itfpo_t, file, "iomd_to_fed_ptp_offload")
)

```

```
#####
```

```

## <summary>
##   Manage ngwc sdm shared memory /dev/shm/sdm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface('polaris_sdm_shm_manage',`
    gen_require(
        type tmpfs_t;
        type polaris_sdm_shm_t;
    )

```

```

fs_getattr_tmpfs($1)
manage_files_pattern($1, tmpfs_t, polaris_sdm_shm_t)
filetrans_pattern($1, tmpfs_t, polaris_sdm_shm_t, file, "sdm")
allow $1 polaris_sdm_shm_t:file map;
)

#####
# MMAP Driver for mapping ASIC Memory space
#####
#####
## <summary>
##   Work (read, write, ioctl) with /dev/chdrvmmmap
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_chdrvmmmap_dev_use',`
gen_require(`
    type device_t;
    type polaris_chdrvmmmap_device_t;
)
read_chr_files_pattern($1, device_t, polaris_chdrvmmmap_device_t)
write_chr_files_pattern($1, device_t, polaris_chdrvmmmap_device_t)
allow $1 polaris_chdrvmmmap_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/gettysburg_dev1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_gettysburg_fpga_dev_use',`
gen_require(`
    type device_t;
    type polaris_gettysburg_fpga_device_t;
)
write_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
read_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
mmap_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
)

```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/cisco/dplriomem
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dplr_iomem_mmapdrv_dev_use`,`
gen_require(`
    type device_t;
    type polaris_dplr_iomem_mmapdrv_device_t;
`)
write_chr_files_pattern($1, device_t, polaris_dplr_iomem_mmapdrv_device_t)
read_chr_files_pattern($1, device_t, polaris_dplr_iomem_mmapdrv_device_t)
allow $1 polaris_dplr_iomem_mmapdrv_device_t:chr_file map;
`
)
```

```
#####
## <summary>
##   Allow access to semaphore of quake flashlib. Pure hack
## semaphore got created by dyncfg accidently, need to change to
## POSIX semaphore code ASAP.
## LOOK AT ME
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_quake_flashlib_sem_use`,`
gen_require(`
    type polaris_dyncfg_t;
`)
allow $1 polaris_dyncfg_t:sem rw_sem_perms;
`
)
```

```
#####
## <summary>
##   Manage quake i2c semaphores /dev/shm/sem.i2c_sem00N
## and work with corresponding i2c devices (/dev/i2c-XXX)
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_quake_i2c_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_quake_i2c_t;
    `)
    manage_files_pattern($1, tmpfs_t, polaris_quake_i2c_t)
    polaris_i2c_use($1)
`)

#####
## <summary>
## Allow caller to read or write the exiting_bays file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_rw_exiting_bays`,`
    gen_require(`
        type polaris_proc_exiting_bays_t;
        type proc_t;
    `)

    rw_files_pattern($1, polaris_proc_exiting_bays_t, polaris_proc_exiting_bays_t)
    # FIXME/TODO:
    # The kernel does not reliably create /proc/exiting_bays on all platforms
    # The following lines should be removed when CSCvv27097 is addressed
    allow $1 polaris_proc_exiting_bays_t:file create;
    allow $1 proc_t:file create;
    allow $1 proc_t:dir { add_name write };
`)

#####
## <summary>
## Allow caller to create open write /tmp/fpga_upgrade
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fpga_upgrade_tmp_use`,`

```

```

gen_require(
    type polaris_fpga_upgrade_tmp_t;
)
allow $1 polaris_fpga_upgrade_tmp_t:file { create open write };
)

#####
## <summary>
## Execute a domain transition to run cat9k_ssd_unmount.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ssd_unmount_domtrans`,`
    gen_require(
        type polaris_ssd_unmount_t, polaris_ssd_unmount_exec_t;
    )
    domtrans_pattern($1, polaris_ssd_unmount_exec_t, polaris_ssd_unmount_t)
)

#####
## <summary>
## Read lnk_file /uicode0, polaris_disk_uicode0_t.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_uicode0_read_lnk`,`
    gen_require(
        type polaris_disk_uicode0_t;
    )
    read_lnk_files_pattern($1, polaris_disk_uicode0_t, polaris_disk_uicode0_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cisco/fpgaioemem
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
#
interface(`polaris_fpga_iomem_mmapfpga_dev_use`,`
gen_require(`
    type device_t;
    type polaris_fpga_iomem_mmapfpga_device_t;
`)
allow $1 polaris_fpga_iomem_mmapfpga_device_t:chr_file map;
    write_chr_files_pattern($1, device_t, polaris_fpga_iomem_mmapfpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_fpga_iomem_mmapfpga_device_t)
`)

#####
## <summary>
## Read Write access to /bootflash/nplusm-power
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_nplusm_power_manage`,`
gen_require(`
    type polaris_nplusm_power_file_t;
    type polaris_disk_bootflash_t;
`)
filetrans_pattern($1, polaris_disk_bootflash_t, polaris_nplusm_power_file_t, file, "nplusm-power")
allow $1 polaris_nplusm_power_file_t:file { write create read open getattr unlink };
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwc.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

```

/usr/binos/conf/boothelper\_evt.sh -- gen\_context(system\_u:object\_r:polaris\_boothelper\_evt\_exec\_t,s0)

/tmp/udev(/.\*)? gen\_context(system\_u:object\_r:polaris\_udev\_tmp\_files\_t,s0)

/tmp/rommon\_upgrade\_ngwc(/.\*)? gen\_context(system\_u:object\_r:polaris\_boothelper\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboothelper.fc

No license file was found, but licenses were detected in source scan.

#

# December 2018, Victor Kamensky

#

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#

## <summary>Polaris ezman\_cc Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmancc.if

No license file was found, but licenses were detected in source scan.

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

define(^polaris\_lipc\_service\_server,`')

define(^polaris\_lipc\_service\_client,`')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_lipc\_fc.m4

No license file was found, but licenses were detected in source scan.

#

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#

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#

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.fc

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#

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#

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#

/usr/binos/conf/install\_issu\_monitor.sh -- gen\_context(system\_u:object\_r:polaris\_issu\_monitor\_exec\_t,s0)

```
/tmp/rp/issu_mon_dir -d gen_context(system_u:object_r:polaris_issu_monitor_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.fc
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2019, Shikhar Dogra
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris fman_cc Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmancc.if
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris smand Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Allow domain to be started by smand with
```

```
## transition into specific service domain.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Type to be used to run utility.
```

```
## </summary>
```

```
## </param>
```

```
## <param name="entry_point">
```

```
## <summary>
```

```
## Type of the program to be used as an entry point to this domain.
```

```
## </summary>
```

```
## </param>
```

```
interface(`polaris_smand_domain`,`
```

```
gen_require(`
```

```
type polaris_smand_t;
```

```
`)
```

```

domtrans_pattern(polaris_smand_t, $2, $1)
')

#####
## <summary>
## Write into fifo file created by smand, typical case when
## smand starts script under popen.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_use_fifo`,`
gen_require(`
type polaris_smand_t;
')

write_fifo_files_pattern($1, polaris_smand_t, polaris_smand_t)
')

#####
## <summary>
## Read access to CRDU fifo file created by smand
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_crdu_pipe_read`,`
gen_require(`
type polaris_crdu_pipe_tmp_t;
')

read_fifo_files_pattern($1, polaris_crdu_pipe_tmp_t, polaris_crdu_pipe_tmp_t)
')

#####
## <summary>
## Manage CRDU fifo file created by smand
## </summary>
## <param name="domain">
## <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_crdu_pipe_manage',`
    gen_require(`
        type polaris_crdu_pipe_tmp_t;
    `)

    manage_fifo_files_pattern($1, polaris_crdu_pipe_tmp_t, polaris_crdu_pipe_tmp_t)
`)

```

```
#####
```

```

## <summary>
## Write to polaris_sman_bshell_serv_lipc_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to connect and write into this lipc file.
## </summary>
## </param>
#

```

```

interface(`polaris_sman_bshell_serv_lipc_write',`
    gen_require(`
        type polaris_sman_bshell_serv_lipc_t;
        type polaris_smand_t;
    `)

    polaris_lipc_write($1, polaris_sman_bshell_serv_lipc_t, polaris_smand_t)
`)

```

```
#####
```

```

## <summary>
## Manage /tmp/show_ports_tmp
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to manage tmp files.
## </summary>
## </param>
## <rolecap/>

```

```

interface(`polaris_trans_ports_tmp_manage',`
    gen_require(`
        type polaris_trans_stats_tmp_t;
    `)

    manage_files_pattern($1, polaris_trans_ports_tmp_t, polaris_trans_ports_tmp_t)
`)

```

```
#####
```

```

## <summary>
## create /tmp/trans_tmp and /tmp/trans_tmp.1 to store lsof output
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to manage tmp files.
## </summary>
## </param>
## <rolecap/>
interface(`polaris_trans_stats_tmp_manage`,`
    gen_require(`
        type polaris_trans_stats_tmp_t;
    `)
    manage_files_pattern($1, polaris_trans_stats_tmp_t, polaris_trans_stats_tmp_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisssmand.if
No license file was found, but licenses were detected in source scan.

```

```

#
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#
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#

```

```

/usr/cpp/bin/cpp_cdm_svr -- gen_context(system_u:object_r:polaris_cpp_cdm_exec_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcdm.fc
No license file was found, but licenses were detected in source scan.

```

```

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#

```

```

## <summary>Polaris Flashlib Policy Rules.</summary>

```

```

#####
# Flashlib policy (infra/flashlib)
#####

```

```

#####
## <summary>

```

```

## Read Polaris /tmp/.flashlock file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_lock`,`
gen_require(`
    type tmp_t;
    type polaris_flashlib_lock_t;
`)

    manage_files_pattern($1, tmp_t, polaris_flashlib_lock_t)
    allow $1 self:capability dac_override;

    ifdef(`quake_platform`,`
        polaris_quake_flashlib_sem_use($1)
    `)
    # access of .flashlock on ultra
    ifdef(`vxe_family`,`
        allow $1 self:capability dac_override;
    `)
)

#####
## <summary>
## Write Polaris /tmp/flashdev.log file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_log`,`
gen_require(`
    type tmp_t;
    type polaris_flashlib_log_t;
`)

    manage_files_pattern($1, tmp_t, polaris_flashlib_log_t)
)

#####
## <summary>
## Read partition disk device that contains rommon variables.

```

```

## C8KV reads object store and reads grub files in BIOS and EFI partitions.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_read',`
    gen_require(`
        type device_t;
        type polaris_flashlib_device_t;
    `)
    polaris_flashlib_lock($1)
    polaris_flashlib_log($1)
    read_blk_files_pattern($1, device_t, polaris_flashlib_device_t)
    read_chr_files_pattern($1, device_t, polaris_flashlib_device_t)
    ifdef(`vxe_family',`
        polaris_vxeinstall_info_read($1)
        polaris_grub_info_read($1)
    `)
    ifdef(`vwlc_platform',`
        polaris_vwlcinstall_info_read($1)
        polaris_vwlc_grub_info_read($1)
    `)

    # processes that use tdllib/DB will access romvar
    # via flashlib mcp_getmonvar API which read /objstore.
    optional_policy(`
        polaris_disk_objstore_read($1)
    `)
    polaris_flash_shm_manage($1)
)

#####
## <summary>
## Write partition disk device that contains rommon variables.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_write',`
    gen_require(`
        type device_t;
        type polaris_flashlib_device_t;

```

```
)

polaris_flashlib_lock($1)
write_blk_files_pattern($1, device_t, polaris_flashlib_device_t)
polaris_flash_shm_manage($1)
)
```

```
#####
## <summary>
##   Manage ngwc shared memory /dev/shm/flash_shm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_flash_shm_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_flash_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_flash_shm_t)
    allow $1 polaris_flash_shm_t:file map;
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisflashlib.if  
No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris LUA Policy Rules.</summary>
```

```
#####
# Lua policy
#####
```

```
#####
## <summary>
## Read Polaris lua files (/lua)
## </summary>
```

```
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_lua_read`,`
gen_require(`
type polaris_lua_file_t;
`)

allow $1 polaris_lua_file_t:file read_file_perms;
allow $1 polaris_lua_file_t:dir { read_file_perms search_dir_perms };
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislua.if

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris tamd_rp Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamdrp.if

No license file was found, but licenses were detected in source scan.

```
#
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#
```

```
## <summary>Polaris polarisiptbl Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiptbl.if

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```
#
# April 2018, Victor Kamensky
#
```

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#

# autopolarisplatformipcbase file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.fc

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#

# February 2020, Victor Kamensky

#

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#

policy\_module(polarisdmiportsfetch, 1.0);

gen\_require(`

    type polaris\_dmi\_ports\_fetch\_t;

')

polaris\_chasfs\_manage(polaris\_dmi\_ports\_fetch\_t)

polaris\_tdlresolve\_read(polaris\_dmi\_ports\_fetch\_t)

polaris\_cpld\_read(polaris\_dmi\_ports\_fetch\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.te

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#

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#

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#

policy\_module(polarisngwcfeddebug, 1.0);

gen\_require(`

    type polaris\_ngwc\_fed\_debug\_mgr\_t;

')

polaris\_bootflash\_manage(polaris\_ngwc\_fed\_debug\_mgr\_t)

polaris\_btrace\_data\_manage(polaris\_ngwc\_fed\_debug\_mgr\_t)

polaris\_cpld\_read(polaris\_ngwc\_fed\_debug\_mgr\_t)

polaris\_flashlib\_read(polaris\_ngwc\_fed\_debug\_mgr\_t)

polaris\_chasfs\_read(polaris\_ngwc\_fed\_debug\_mgr\_t)

```

polaris_tdlresolve_read(polaris_ngwc_fed_debug_mgr_t)

polaris_disk_bootflash_read_lnk(polaris_ngwc_fed_debug_mgr_t)
polaris_dmammap_dev_use(polaris_ngwc_fed_debug_mgr_t)
polaris_chdrvmmmap_dev_use(polaris_ngwc_fed_debug_mgr_t)
polaris_dplr_iomem_mmapdrv_dev_use(polaris_ngwc_fed_debug_mgr_t)

# opens /proc/pid/net/dev
kernel_read_network_state(polaris_ngwc_fed_debug_mgr_t)

# calls tcpdump, let it run in its own domain
netutils_domtrans(polaris_ngwc_fed_debug_mgr_t)

# calls system function
corecmd_exec_shell(polaris_ngwc_fed_debug_mgr_t)

# calls lspci and other utilities
corecmd_exec_bin(polaris_ngwc_fed_debug_mgr_t)

auth_use_nsswitch(polaris_ngwc_fed_debug_mgr_t)

# lspci needs sysfs access
dev_list_sysfs(polaris_ngwc_fed_debug_mgr_t)
dev_read_sysfs(polaris_ngwc_fed_debug_mgr_t)

# dope.py /tmp/idope_svr, /tmp/shfwd_svr socket files
type polaris_fed_debug_sock_t;
files_tmp_file(polaris_fed_debug_sock_t)

files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_sock_t, sock_file, "idope_svr")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_sock_t, sock_file, "shfwd_svr")

gen_require(
    type tmp_t;
)
manage_sock_files_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_sock_t)

# allow show-forward to use following temp files in /tmp dir
type polaris_fed_debug_tmp_t;
files_tmp_file(polaris_fed_debug_tmp_t)
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "pktgen.txt")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "DopeElam.sh")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "MemDumpElam.sh")
gen_require(
    type tmp_t;
)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, { tmp_t polaris_fed_debug_tmp_t },
polaris_fed_debug_tmp_t)

```

```

# talk to fed over unix sockets
polaris_fed_sock_write(polaris_ngwc_fed_debug_mgr_t)

# /dcmlog.txt
type polaris_fed_debug_dcmlog_t;
files_type(polaris_fed_debug_dcmlog_t)
gen_require(
    type root_t;
)
filetrans_pattern(polaris_ngwc_fed_debug_mgr_t, root_t, polaris_fed_debug_dcmlog_t, file, "dcmlog.txt")
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, root_t, polaris_fed_debug_dcmlog_t)

# dope.py listens on port 12255
corenet_tcp_bind_generic_node(polaris_ngwc_fed_debug_mgr_t)
allow polaris_ngwc_fed_debug_mgr_t self:tcp_socket { getattr setopt ioctl getopt bind create listen accept connect
read write };
corenet_tcp_bind_polaris_fed_debug_trace_rpc_port(polaris_ngwc_fed_debug_mgr_t)
corenet_tcp_connect_polaris_fed_debug_trace_rpc_port(polaris_ngwc_fed_debug_mgr_t)

# dope.py listens on port 5389 for shfwd commands
corenet_tcp_bind_polaris_fed_debug_shfwd_command_port(polaris_ngwc_fed_debug_mgr_t)

# LOOK AT ME: /dev/mem access restriction remove after fix for CSCvm07702 is
# committed.
#ifdef(^nyquist_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
)
#ifdef(^starfleet_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
)
#ifdef(^quake_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
)

# /tmp/asic_config.pickle file access
type polaris_fed_debug_asic_config_t;
files_tmp_file(polaris_fed_debug_asic_config_t);
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_asic_config_t, file, "asic_config.pickle")
gen_require(
    type tmp_t;
)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_asic_config_t)

# dope.py invokes scapy.py for DP trace which needs to create socket to seek
# interface info via ioctl ifreq
allow polaris_ngwc_fed_debug_mgr_t self:udp_socket { create ioctl };

```

```

# /tmp/rdope_ffi handle directory where libffi will create file with execute
# mapping. Files system should be executable and /tmp so far is. Note TMPDIR
# environment variable is the first choice where to create libffi executable
# mapped files.
type polaris_fed_debug_ffi_t;
files_tmp_file(polaris_fed_debug_ffi_t);
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_ffi_t, dir, "rdope_ffi")
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_ffi_t)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_ffi_t, polaris_fed_debug_ffi_t)
allow polaris_ngwc_fed_debug_mgr_t polaris_fed_debug_ffi_t:file { execute map };

# allow to read /proc/mtd called from mcp_getmonvar
kernel_read_system_state(polaris_ngwc_fed_debug_mgr_t)

polaris_remap_mem_dev_use(polaris_ngwc_fed_debug_mgr_t)

allow polaris_ngwc_fed_debug_mgr_t self:capability sys_resource;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.te

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dnl

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dnl

dnl Process Names Map

```
define(^process_map', `defn(format(`process_map[%s]", ` $1')))
```

```
define(^process_map_set', `define(format(`process_map[%s]", ` $1'), ` $2'))
```

dnl Process Names and Labels

```
define(^process_short_name', `patsubst($1, `^BPROC_', `'))
```

```
define(^process_default_stem', `translit(process_short_name($1), `A-Z', `a-z'))
```

```
define(^process_stem', `ifelse(process_map(process_short_name($1)), `', process_default_stem($1),
process_map(process_short_name($1)))')
```

```
define(^process_label', `format(` polaris_%s_t', process_stem($1))')
```

```
define(^process_exec_label', `format(` polaris_%s_exec_t', process_stem($1))')
```

dnl Process Type Map: track that type declations unique

```
define(^process_type_map', `defn(format(`process_type_map[%s]", ` $1')))
```

```
define(^process_type_map_set', `define(format(`process_type_map[%s]", ` $1'), ` $2'))
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_process.m4

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process\_map\_set(AUTO\_UPGRADE\_CLIENT\_RP, autoupgrade)

process\_map\_set(BSM\_RP, bsm)

process\_map\_set(BTM\_CC, btman)

process\_map\_set(BTM\_FP, btman)

process\_map\_set(BTM\_RP, btman)

process\_map\_set(BTM\_BP, btman)

process\_map\_set(CCD\_RP, caf)

process\_map\_set(DMI\_CONFD, confd)

process\_map\_set(DMI\_PTTCD, pttcd)

process\_map\_set(SDWAN\_CONFD, confd)

process\_map\_set(EMD\_CC, emd)

process\_map\_set(EMD\_FP, emd)

process\_map\_set(EMD\_RP, emd)

process\_map\_set(FCD\_RP, flashcheck)

process\_map\_set(FM\_FP, fman\_fp)

process\_map\_set(FM\_CC, fman\_cc)

process\_map\_set(FM\_RP, fman\_rp)

process\_map\_set(HM\_CC, hm)

process\_map\_set(HM\_FP, hm)

process\_map\_set(HM\_RP, hm)

process\_map\_set(IOMD\_CC, iomd)

process\_map\_set(IOSD\_CC, iosd)

process\_map\_set(IOSD\_RP, iosd)

process\_map\_set(IOSD\_BP, iosd)

process\_map\_set(IOXM\_RP, ioxman)

process\_map\_set(ISSU\_STK, issu\_stack)

process\_map\_set(LM\_RP, lm)

process\_map\_set(MAINT\_RP, periodic)

process\_map\_set(PLOGD\_CC, plogd)

process\_map\_set(PLOGD\_FP, plogd)

process\_map\_set(PLOGD\_RP, plogd)

process\_map\_set(REPM\_RP, repm)

process\_map\_set(SERVICE\_MGR\_RP, service\_mgr)

process\_map\_set(SERVICE\_MGR\_FP, service\_mgr)

process\_map\_set(SM, smand)

process\_map\_set(SORT\_RP, sort\_files)

process\_map\_set(VMAN\_RP, vman)

process\_map\_set(POLJVM, jvm)

```
process_map_set(CLUSTERMGR, clustermgr)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/processmap.m4
```

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```
dnl
```

```
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```

```
dnl
```

```
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
```

```
dnl All rights reserved
```

```
dnl
```

```
divert(-1)
```

```
include(`polaris_process.m4')
```

```
include(`polaris_database_db.m4')
```

```
include(`polaris_database_db_if.m4')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
```

```
#
```

```
# This is a generated file! Instead of modifying this file,
```

```
# modify proper platform TDL file.
```

```
#
```

```
## <summary>Polaris Platform DB Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_if.m4
```

No license file was found, but licenses were detected in source scan.

```
dnl
```

```
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```

```
dnl
```

```
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```

```
dnl All rights reserved
```

```
dnl
```

```
dnl VXE Platform Max Bay Limits
```

```
max_bay_map_set(`rp', `per_bay', 0)
```

```
max_bay_map_set(`cc', `per_bay', 0)
```

```
max_bay_map_set(`fp', `per_bay', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/vxemaps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

# January 2021, Gabriel Lee, Shawn Liu

#

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#

/ezManage\_v1/ezManage\_sms\_handler.py -- gen\_context(system\_u:object\_r:polaris\_ezmanage\_exec\_t,s0)

/ezManage\_v1(/.\*)? gen\_context(system\_u:object\_r:polaris\_ezmanage\_file\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmanage.fc

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#

# April 2017, Victor Kamensky

#

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#

## <summary>Polaris dmi\_vtyserverutild Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmi\_vtyserverutild.if

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#

# August 2017, Victor Kamensky

#

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#

# polarisbsm file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbsm.fc

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#

# February 2020, Victor Kamensky

#

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#

## <summary>Polaris dmi\_ports\_fetch Policy Rules.</summary>

```
#####
```

```
## <summary>
```

```
## Work with /bootflash/sdavic
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_sdavic_proxy_manage`,`
```

```
gen_require(`
```

```
type polaris_sdavic_proxy_files_t;
```

```
`)
```

```
manage_files_pattern($1, polaris_sdavic_proxy_files_t, polaris_sdavic_proxy_files_t)
```

```
manage_dirs_pattern($1, polaris_sdavic_proxy_files_t, polaris_sdavic_proxy_files_t)
```

```
`)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissdavicproxy.if
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/usr/binos/bin/cman_fp_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
```

```
/usr/binos/bin/cman_fp_us_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
```

```
/usr/binos/bin/cman_fp_vwlc -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
```

```
/usr/binos/bin/cman_fp_vwlc_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
```

```
/usr/binos/bin/cman_fp_sumatra_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
```

```
/usr/binos/conf/mcp_pcie_status_cmd.sh -- gen_context(system_u:object_r:polaris_pcie_status_cmd_exec_t,s0)
```

```
/dev/hkp -c gen_context(system_u:object_r:polaris_hkp_device_t,s0)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmfp.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# June 2020, Manu Roy
```

```
#
```

```
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```

```

# All rights reserved
#

# /bootflash labels
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?     gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/.ssh/ssh_host.*_key     gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)

# /flash is symbolic link /flash10/USER
/flash                     gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

#flash1
/flash1(/.*)?             gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash1/CRASH(/.*)?      gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash1/CRASH/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash7(/.*)?            gen_context(system_u:object_r:polaris_disk_license_t,s0)
/flash8(/.*)?            gen_context(system_u:object_r:polaris_disk_license_t,s0)
/flash9(/.*)?            gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /flash10
# USER is a reserved selinux keyword - escape it like this
/flash10(/.*)?           gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/flash10/USE[R]/core(/.*)?  gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash10/USE[R]/nvram_config -- gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/flash10/USER/.ssh/ssh_host_rsa_key -- gen_context(system_u:object_r:sshd_key_t,s0)

#sdflash
/dev/mmcblk1p1 -b        gen_context(system_u:object_r:polaris_iots_swipedrive_device_t,s0)
/dev/sdflash            gen_context(system_u:object_r:polaris_iots_swipedrive_file_t,s0)
/sdflash               gen_context(system_u:object_r:polaris_iots_swipedrive_file_t,s0)
#usb device
/dev/sda1 -b           gen_context(system_u:object_r:polaris_iots_swipedrive_device_t,s0)

#DMA ASIC driver
/dev/mvDmaDrv          gen_context(system_u:object_r:polaris_iots_mvDmaDrv_device_t,s0)
/dev/mvIntDrv          gen_context(system_u:object_r:polaris_iots_mvIntDrv_device_t,s0)

# /crashinfo is symbolic link to /mnt/sd1 created by systemd-tmpfiles
/crashinfo             gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)

#/dev
/dev/petra-fpga -c      gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
/dev/petra-zynq-ps-gpio -c  gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
/dev/petra-gpio-pc3 -c     gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
#Line card fpga driver for mmap
/dev/petra-lc-fpga -c     gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)

```

```
#memory devices
/dev/tm -c          gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)
/dev/hcam -c       gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)
#vlan-virtual ethernet
/dev/petra-krport -c  gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)

/tmp/udev/etc/udev/sdflash/udev-info gen_context(system_u:object_r:polaris_udev_tmp_files_t,s0)

# hellcat
/dev/spidev0.0 -c   gen_context(system_u:object_r:polaris_iots_led_device_t,s0)
/dev/spidev0.1 -c   gen_context(system_u:object_r:polaris_iots_led_device_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiotsswitch.fc

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisngwcfed, 1.0);
```

```
gen_require(
    type polaris_ngwc_fed_t;
)
```

```
polaris_btrace_data_manage(polaris_ngwc_fed_t)
polaris_chasfs_manage(polaris_ngwc_fed_t)
polaris_tdlresolve_read(polaris_ngwc_fed_t)
polaris_tdlldb_list_dirs(polaris_ngwc_fed_t)
polaris_lua_read(polaris_ngwc_fed_t)
polaris_flashlib_read(polaris_ngwc_fed_t)
polaris_chasync_files_manage(polaris_ngwc_fed_t)
```

```
# LOOK AT ME: system() call restriction remove after
# CSCvn19282 is fixed using CSCvn19287.
#
# fed executes cp_trace_request.sh when a sv stack split occurs.
# cp_trace_request.sh does source of pglobals.sh which requires the
# access of /crashinfo.
polaris_disk_crashinfo_getattr(polaris_ngwc_fed_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_ngwc_fed_t)
```

```

polaris_db_tdlb_dir_use(polaris_ngwc_fed_t)

corecmd_exec_bin(polaris_ngwc_fed_t)
corecmd_exec_shell(polaris_ngwc_fed_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_ngwc_fed_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_ngwc_fed_t)

# allow read/write to /proc/irq/N/irq files
kernel_rw_irq_sysctls(polaris_ngwc_fed_t)

polaris_obfl_data_manage(polaris_ngwc_fed_t)
polaris_lsmpi_dev_use(polaris_ngwc_fed_t)

allow polaris_ngwc_fed_t self:capability { sys_rawio dac_override ipc_owner sys_nice ipc_lock };
allow polaris_ngwc_fed_t self:capability2 block_suspend;

polaris_dyncfg_tmp_read(polaris_ngwc_fed_t)

optional_policy(`
polaris_ngwc_shm_manage(polaris_ngwc_fed_t)
`)

optional_policy(`
polaris_ngwc_scc_shm_manage(polaris_ngwc_fed_t)
`)

# cpp bleeds into switching platforms through fman_fp and fed
# apparently even on nyquist fed creates /tmp/cpp_anon_db
polaris_cpp_process(polaris_ngwc_fed_t)
polaris_cpp_tmp_files_use(polaris_ngwc_fed_t)

optional_policy(`
# /dev/dplr_intrpt usage
polaris_dplr_dev_use(polaris_ngwc_fed_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_ngwc_fed_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_ngwc_fed_t)
`)

# /dev/cli2xcvr_pipe and /dev/xcvr2cli_pipe
type polaris_fed_xcvr_pipe_t;

```

```

files_type(polaris_fed_xcvr_pipe_t)
dev_associate(polaris_fed_xcvr_pipe_t)
gen_require(
    type device_t;
)
filetrans_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t, fifo_file, "cli2xcvr_pipe")
filetrans_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t, fifo_file, "xcvr2cli_pipe")
manage_fifo_files_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t)

polaris_disk_bootflash_search(polaris_ngwc_fed_t)

allow polaris_ngwc_fed_t self:process setsched;

# work with /dev/msi/Slot0/Doppler0/GroupN files
dev_rw_generic_chr_files(polaris_ngwc_fed_t)

# read /sys/devices/system/cpu/online
dev_read_sysfs(polaris_ngwc_fed_t)

# bind to shfwd port
corenet_udp_bind_polaris_ngwc_fed_shfwd_port(polaris_ngwc_fed_t)

# connect to shfwd port
corenet_tcp_connect_polaris_fed_debug_shfwd_command_port(polaris_ngwc_fed_t)

# creates and write /flash/shfwd_params.txt file
polaris_bootflash_manage(polaris_ngwc_fed_t)

# use polaris_ngwc_fed_t as syslog_client_type
logging_send_syslog_msg(polaris_ngwc_fed_t)

# bind to dbgmn port
corenet_udp_bind_polaris_ngwc_fed_dbgmn_port(polaris_ngwc_fed_t)

corenet_udp_bind_generic_node(polaris_ngwc_fed_t)
allow polaris_ngwc_fed_t self:udp_socket { bind create getopt };

optional_policy(
# on macallan cman_fp needs access to /dev/cisco/dplriomem
# for mapping dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_ngwc_fed_t);
)

# On Macallan as part of doppler sdk_asic_init(), a
# rw call is made to /dev/cpld
polaris_cpld_dev_use(polaris_ngwc_fed_t)
polaris_cpld_read(polaris_ngwc_fed_t)

```

```

#ptp_init_systemclock() called during fed process init writes
# /sys/devices/platform/cpld/reg_doppe_1588_sync
polaris_cpld_write(polaris_ngwc_fed_t)

optional_policy(
# In Macallan cards which use Doppler ASIC,
# ngmod_doppler_mmap() api is called to get hold of
# MMapped Asic address. As part of the operation it uses
# /dev/chdrvmmmap device.
polaris_chdrvmmmap_dev_use(polaris_ngwc_fed_t)
)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvk00737 is fixed using CSCvk00741
#ifdef(^nyquist_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvm34589 is fixed using CSCvm34617
#ifdef(^starfleet_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn64182 is fixed using CSCvn64184
#ifdef(^quake_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
)

#ifdef(^sumatra_platform',`
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_ngwc_fed_t)
polaris_sumatra_doppler_dev_use(polaris_ngwc_fed_t)
)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn08008 is fixed using CSCvn08019.
# FED accesses raw memory (/dev/mem) for sending/receiving OOB
# traffic on an FSS interface.
#ifdef(^passport_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
)

#Entropy number is read from ACT2 and stored in /tmp/hw_entropy
#Allow sesa library read from /tmp/hw_entropy to update random
#number seed.

```

```

polaris_hw_entropy_read(polaris_ngwc_fed_t)

# fed is server for /tmp/dbgmn_log_svr socket file
type polaris_fed_sock_t;
files_tmp_file(polaris_fed_sock_t)

files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_sock_t, sock_file, "dbgmn_log_svr")

gen_require(
    type tmp_t;
)
manage_sock_files_pattern(polaris_ngwc_fed_t, tmp_t, polaris_fed_sock_t)

optional_policy(
    # talk to rdope.sh over unix sockets
    polaris_fed_debug_sock_write(polaris_ngwc_fed_t)
)

# /dev/shm/sdm access
optional_policy(
    polaris_sdm_shm_manage(polaris_ngwc_fed_t)
)

# creates few files under /tmp/installer (e.g like
# /tmp/installer/phy_shannon_ver_1) to indicate current h/w conditions
polaris_install_tmp_manage(polaris_ngwc_fed_t)

# communication between the nif manager and fed use directories under /tmp/sv
polaris_sv_tmp_use(polaris_ngwc_fed_t)

optional_policy(
    polaris_quake_i2c_manage(polaris_ngwc_fed_t)
)

# work with /tmp files (/tmp/fed_post_results)
type polaris_fed_tmp_t;
files_tmp_file(polaris_fed_tmp_t)
files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_tmp_t, file, "fed_post_result")
files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_tmp_t, dir, "test_mrvlphy")
manage_files_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
manage_dirs_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
manage_fifo_files_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
polaris_cm_rp_tmp_manage(polaris_ngwc_fed_t)

# Allow write to flash. Needed for template support.
polaris_flashlib_write(polaris_ngwc_fed_t)

# CSCvo78054 will be used to fix fed policies on crankshaft properly.

```

```
# Below policy is just to unblock Nightwatch boot issue on ISR in
# enforcing mode.
ifdef(`crankshaft_family',`
# ISR Nightwatch module accesses libraries compiled with icc
polaris_icc_broken_relocations(polaris_ngwc_fed_t)

#ISR Nightwatch module creates softlink /flash -> /bootflash
gen_require(`
    type root_t;
')
filetrans_pattern(polaris_ngwc_fed_t, root_t, polaris_disk_bootflash_t, lnk_file, "flash")

')

optional_policy(`
polaris_epc_ws_liaison_tmp_read(polaris_ngwc_fed_t)
')

# ngwc-fed manage /tmp/epc_ws/fed_to_wif_pipe file fifo_file.
optional_policy(`
polaris_epc_ws_liaison_fifo_manage(polaris_ngwc_fed_t)
')

optional_policy(`
polaris_ngwc_itfpo_manage(polaris_ngwc_fed_t)
')

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(`
polaris_serdes_asic_key_tmp_manage(polaris_ngwc_fed_t)
')

# ngwc-fed creates /tmp/epc_ws dir
optional_policy(`
polaris_epc_ws_liaison_tmp_file(polaris_ngwc_fed_t)
')

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.te
No license file was found, but licenses were detected in source scan.

#
# April 2017, Victor Kamensky
#
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#
```

```
/usr/binos/sbin/ncsshd -- gen_context(system_u:object_r:polaris_dmi_ncsshd_mgmt_exec_t,s0)
/var/run/ncsshd_mgmt\,pid -- gen_context(system_u:object_r:polaris_dmi_ncsshd_mgmt_var_run_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdmgmt.fc
```

No license file was found, but licenses were detected in source scan.

```
#
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#
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#
```

```
/usr/binos/conf/mcp_smartctl_cmds.sh -- gen_context(system_u:object_r:polaris_smartctl_exec_t,s0)
```

```
/tmp/smart.pid -- gen_context(system_u:object_r:polaris_smartctl_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngiolite.fc
```

No license file was found, but licenses were detected in source scan.

```
#
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#
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#
```

```
/tmp/tmppub/interceptor(/.*)?          gen_context(system_u:object_r:polaris_pttcd_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.fc
```

No license file was found, but licenses were detected in source scan.

```
#
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#
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#
```

```
## <summary>Polaris Cfg Policy Rules.</summary>
```

```
#####
# Cfg files policy
#####
```

```
#####
## <summary>
##   Manage cfg files (under /tmp/sw/cfg)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_cfg_data_manage`,`
gen_require(`
  type polaris_cfg_data_t;
`)

  manage_dirs_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
  manage_files_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
  manage_lnk_files_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfg.if

No license file was found, but licenses were detected in source scan.

```
#
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#
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#

```

```
policy_module(polarisngiolite, 1.0);

gen_require(`
  type polaris_ngiolite_t;
`)

polaris_btrace_data_manage(polaris_ngiolite_t)
polaris_crft_data_manage(polaris_ngiolite_t)
polaris_chasfs_manage(polaris_ngiolite_t)
polaris_tdlresolve_read(polaris_ngiolite_t)
polaris_tdlldb_list_dirs(polaris_ngiolite_t)
polaris_cpld_read(polaris_ngiolite_t)
polaris_flashlib_read(polaris_ngiolite_t)

optional_policy(`
polaris_cpp_tmp_ifdev_use(polaris_ngiolite_t)

```

```

)

# In the file of radium_xcvt.c allow access to create and bind
# the socket using the API bnxt_impl_init_netlink.
allow polaris_ngiolite_t self:netlink_generic_socket { bind create getattr setopt };

# in iot platforms, ngiolite needs access to /proc/sys/net/ipv6/conf/mvsw/disable_ipv6
optional_policy(
kernel_rw_net_sysctls(polaris_ngiolite_t)
kernel_search_network_sysctl(polaris_ngiolite_t)
)

# PLEASE LOOK AT code should not use sysv IPC ARIs,
# instead POSIX variants must be used. Remove after
# code changed in proper way
# allow access sysv semaphor created by qfp process
ifdef(`crankshaft_family',`
polaris_qfp_sem_use(polaris_ngiolite_t)
polaris_ggpio_dev_read_write(polaris_ngiolite_t)
polaris_dplr_dev_use(polaris_ngiolite_t)
)

ifdef(`fugazi_platform',`
polaris_qfp_sem_use(polaris_ngiolite_t)
)

# write access to /sys/bus/pci/rescan
dev_rw_sysfs(polaris_ngiolite_t)
# LOOK AT ME ngiolite does it through "echo 1 > /sys/bus/pci/rescan" seems to much
# to grunt shell and bin access just to write "1" string into the file
corecmd_exec_bin(polaris_ngiolite_t)
corecmd_exec_shell(polaris_ngiolite_t)
# allow read of /etc/passwd
auth_use_nsswitch(polaris_ngiolite_t)

polaris_firmware_read(polaris_ngiolite_t)

polaris_udev_tmp_list_dirs(polaris_ngiolite_t)

# allow access to read the file cman rommon file.
polaris_proc_rmonbifo_getattr(polaris_ngiolite_t)
polaris_proc_rmonbifo_read(polaris_ngiolite_t)

allow polaris_ngiolite_t self:capability { net_admin sys_rawio };

# allow system time capability to check for system timeout
# while checking the state using API cwan_modem_check_ready_state
allow polaris_ngiolite_t self:capability sys_time;

```

```

# allow access to nim_xxd file created by cmcc
polaris_nim_xxd_tmp_open_unlink(polaris_ngiolite_t);

# ngiolite needs to work with /dev/sd /dev/sg devices to figure out disk driver
# paramters. drivers/userspace/nim_xxd library
storage_raw_read_fixed_disk(polaris_ngiolite_t)
storage_read_scsi_generic(polaris_ngiolite_t)
storage_write_scsi_generic(polaris_ngiolite_t)

polaris_sysfs_platform_dev_use(polaris_ngiolite_t)

# LOOK AT ME: ngiolite needs to work with /dev/ds31408, which is generic device_t now
gen_require(
    type device_t;
)
rw_chr_files_pattern(polaris_ngiolite_t, device_t, device_t)

# modprobe nim_dm dm_drv_log_level=0x01
ifdef(`crankshaft_family',`
modutils_domtrans_insmod(polaris_ngiolite_t)
)

polaris_smartctl_domtrans(polaris_ngiolite_t)

# utah_fpge_driver.c needs socket to configure interface parameters
allow polaris_ngiolite_t self:udp_socket create_socket_perms;

polaris_utility_domain_template(smartctl)

corecmd_exec_bin(polaris_smartctl_t)
corecmd_exec_shell(polaris_smartctl_t)

# allow access to polaris_cpp_tmpfs_t file
# Example is ifdev shared memory /dev/shm/cpp_ifdev_shmem
# The ngiolite init function calls the api ifdev_init
# to initialize shared memory control info.
fs_getattr_tmpfs(polaris_ngiolite_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_ngiolite_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_smartctl_t)

logging_send_syslog_msg(polaris_smartctl_t)

fstools_domtrans(polaris_smartctl_t)

# runs tar /bin/tar -xvzf /firmware/MicronP400m-MTFDDAK200MAN.pkg -C /firmware

```

```

polaris_firmware_manage(polaris_smartctl_t)
files_getattr_all_dirs(polaris_smartctl_t)
files_read_all_symlinks(polaris_smartctl_t)

# work with /dev/sgX
storage_read_scsi_generic(polaris_smartctl_t)
storage_write_scsi_generic(polaris_smartctl_t)

allow polaris_smartctl_t self:capability { chown dac_override fowner fsetid };

type polaris_smartctl_tmp_t;
files_tmp_file(polaris_smartctl_tmp_t)
files_tmp_filetrans(polaris_smartctl_t, polaris_smartctl_tmp_t, file, "smart.pid")
manage_files_pattern(polaris_smartctl_t, polaris_smartctl_tmp_t, polaris_smartctl_tmp_t)

# script inherits stdout from ngiolite, needs permission to append to it
polaris_use_btrace_fifo(polaris_smartctl_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh55517)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_ngiolite_t)
')

#ifdef(`sparrow_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
polaris_tty_NMEA_dev_use(polaris_ngiolite_t)
')

#ifdef(`blackheart_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
')

#ifdef(`cabo_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
')

#ifdef(`aventus_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
polaris_tty_NMEA_dev_use(polaris_ngiolite_t)
')

#ifdef(`crankshaft_family',`
# allow scan pci/devices proc dir
# The ngiolite init function makes call to o2_cvmx_remote_open to
# open the remote library connection to cavium chip in FFP.
# The octeon library call invokes pci_get_device, which needs to

```

```

# access /proc .
kernel_getattr_proc_files(polaris_ngiolite_t)
kernel_write_proc_files(polaris_ngiolite_t)
kernel_read_system_state(polaris_ngiolite_t)

# allow access to /tmp/octeon-remote-lock-pci***
# This is required as part of ngiolite access of octeon chip.
# As part of the init, call is made to octeon_remote_lock()
# which requires access to the /tmp file.
polaris_cm_fp_tmp_filetrans(polaris_ngiolite_t)
polaris_cm_fp_tmp_manage(polaris_ngiolite_t)

#####
## CWAN NGIOLITE process policies start#####
#####
#cwan running as a ngiolite process needs to be able to RW/IOCTL to qcqmiX files
polaris_qcqmi_dev_use(polaris_ngiolite_t)

#RDM thread in CWAN running as ngiolite process needs access to ttyUSB0 for DM logging
term_use_usb_ttys(polaris_ngiolite_t)

#RDM/Event thread needs to add a newly generated DM log file/Crash dump file to/from bootflash directory
polaris_bootflash_manage(polaris_ngiolite_t)

#Modem Monitor thread uses sendto over a Datagram socket to send datato Turing Thread
allow polaris_ngiolite_t self:unix_dgram_socket sendto;

#Modem Monitor thread opens a socket to UDEV to process Modem USB addition/disconnection events
allow polaris_ngiolite_t self:netlink_kobject_uevent_socket create_socket_perms;

#Modem Monitor thread needs to be able to open/Read and GetAttributes to differentiate between Telit/SWI vendor
udev_rw_db(polaris_ngiolite_t)

#Turing thread needs to gather stats as well as set the IP address to /proc/net/cwan_modem0/cwan0/src_ip
kernel_search_network_state(polaris_ngiolite_t)
polaris_kernel_rw_network_state_files(polaris_ngiolite_t)

#####
## CWAN NGIOLITE process policies end#####
#####
')

# on tsn need access to /sys/devices/platform/moka_fpga
# /sys/devices/platform/moka_fpga/external_int_pending dev
optional_policy(
polaris_mokafpga_rw(polaris_ngiolite_t)
')

```

```

# on radium need to get model info
optional_policy(`
polaris_dash_dev_use(polaris_ngiolite_t)
`)

# work with contdev sysfs files
polaris_contdev_dev_read(polaris_ngiolite_t)

sysnet_domtrans_ifconfig(polaris_ngiolite_t)

logging_send_syslog_msg(polaris_ngiolite_t)

ifdef(`neptune_platform',`
polaris_cpp_cavium_sdk_ipc_use(polaris_ngiolite_t)
`)

optional_policy(`
polaris_nim_dm_dev_use(polaris_ngiolite_t)
`)

ifdef(`radium_platform',`
#allow ngiolite to access nim_phy_device
polaris_nim_phy_dev_use(polaris_ngiolite_t)
`)

# TODO/FIXME, Need to review this permission, this is related to
# the call "echo 1 > /sys/bus/pci/rescan"
dev_manage_sysfs_dirs(polaris_ngiolite_t)
allow polaris_ngiolite_t sysfs_t:file create;

# allow ngiolite to access sfp over i2c bus
polaris_i2c_use(polaris_ngiolite_t)

# on neptune, cavium library in o2_cavm_mem_map wants access to
# /sys/devices/pci0000:00/0000:00:01.0/0000:01:00.0/resource0
optional_policy(`
polaris_cpp_cavium_dma_map(polaris_ngiolite_t)
`)

# /dev/sfp-ktr & qfp sem access on Katar
ifdef(`katar_platform',`
polaris_sfp_katar_dev_use(polaris_ngiolite_t)
polaris_qfp_sem_use(polaris_ngiolite_t)
fs_getattr_tmpfs(polaris_ngiolite_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_ngiolite_t)
`)

# allow /usr/binos/bin/ngiolite to access /tmp/nim_xxd_present

```

```

gen_require(
    type polaris_cmrp_nim_xxd_tmp_t;
)
files_tmp_file(polaris_cmrp_nim_xxd_tmp_t)
files_tmp_filetrans(polaris_ngiolite_t, polaris_cmrp_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_ngiolite_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)

# allow /usr/binos/bin/ngiolite to access /tmp/hd_sz
gen_require(
    type udev_tmp_t;
)
read_files_pattern(polaris_ngiolite_t, udev_tmp_t, udev_tmp_t)

# allow /usr/sbin/lvm to be executed and to be operated
lvm_domtrans(polaris_ngiolite_t)

# allow /usr/binos/bin/ngiolite to manage /tmp
type polaris_ngiolite_tmp_t;
files_tmp_file(polaris_ngiolite_tmp_t)
# allow /usr/binos/bin/ngiolite to manage /tmp/smartctl.out and
#
# /tmp/xxdisplay.out
files_tmp_filetrans(polaris_ngiolite_t, polaris_ngiolite_tmp_t, file)
manage_files_pattern(polaris_ngiolite_t, polaris_ngiolite_tmp_t, polaris_ngiolite_tmp_t)

# allow /usr/sbin/smartctl to operate on fsadm_exec_t
fstools_domtrans(polaris_ngiolite_t)

# allow /usr/sbin/smartctl to access nvme device in chr and blk
dev_nvme_chr_files_manage(polaris_ngiolite_t)
dev_nvme_blk_files_manage(polaris_ngiolite_t)

ifdef(^sumatra_platform',`
# dev/cpld
polaris_cpld_dev_use(polaris_ngiolite_t)

# manage "sysctrl_i2c.lck"
gen_require(
    type polaris_cm_rp_tmp_t;
)
files_tmp_filetrans(polaris_ngiolite_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_ngiolite_t)

# access /dev/huron_fpga
polaris_huron_dev_use(polaris_ngiolite_t)

)

ifdef(^crankshaft_family',`

```

```

# /var/run/cwan socket and pid
gen_require(`
    type polaris_cwan_svr_var_run_t;
`)
files_pid_filetrans(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, sock_file, "cwan_ezmanage_cwan_server")
create_sock_files_pattern(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)
delete_sock_files_pattern(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)
`)

# allow /usr/binos/bin/ngiolite to access the the following interface
fs_unmount_xattr_fs(polaris_ngiolite_t)
dev_manage_generic_symlinks(polaris_ngiolite_t)
polaris_udev_tmp_manage(polaris_ngiolite_t)

# ngiolite/ezManage access rules - currently only applies to TSN
optional_policy(`
    # Allow ngiolite to access ezManage dgram socket
    gen_require(`
        type polaris_ezmanage_t;
    `)
    allow polaris_ngiolite_t polaris_ezmanage_t:unix_dgram_socket sendto;

    # Allow ngiolite to access ezManage socket file in /var/run
    polaris_manage_ezmanage_var_run_files(polaris_ngiolite_t)
`)

# allow ngiolite to access /dev/nim_phy
ifdef(`crankshaft_family',`
polaris_nim_phy_dev_use(polaris_ngiolite_t)
`)

# allow ioctl, read, wr permission for ds31408 device
optional_policy(`
polaris_ds31408_dev_use(polaris_ngiolite_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngiolite.te
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#
# April 2017, Victor Kamensky
#
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#

/tmp/\.ncsshd_bp\sock -s gen_context(system_u:object_r:polaris_dmi_ncsshd_log_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincshdfwd.fc

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```
#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris vdaemon Policy Rules.</summary>
```

```
#####
## <summary>
##   Write vdaemon /var/run socket file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vdaemon_var_sock_write`,
  gen_require(`
    type polaris_vdaemon_t;
    type polaris_vdaemon_var_run_t;
    type var_run_t;
  `)
  write_sock_files_pattern($1, var_run_t, polaris_vdaemon_var_run_t)
  allow $1 polaris_vdaemon_t:unix_stream_socket { connectto };
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisboothelper, 1.0);
```

```
polaris_process_domain_template(boothelper_evt)
```

```

corecmd_exec_bin(polaris_boothelper_evt_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_boothelper_evt_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_boothelper_evt_t)

polaris_cpuld_read(polaris_boothelper_evt_t)

#####
# work with /tmp/udev/.

type polaris_udev_tmp_files_t;
files_tmp_file(polaris_udev_tmp_files_t)

polaris_systemd_tmpfiles_tmp_filetrans(polaris_udev_tmp_files_t, dir, "udev")

polaris_bootflash_manage(polaris_boothelper_evt_t)

type polaris_boothelper_tmp_t;
files_tmp_file(polaris_boothelper_tmp_t)
files_tmp_filetrans(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, dir, "rommon_upgrade_ngwc")
manage_files_pattern(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, polaris_boothelper_tmp_t)
manage_dirs_pattern(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, polaris_boothelper_tmp_t)
# watch over /tmp/rommon_upgrade_ngwc
allow polaris_boothelper_evt_t polaris_boothelper_tmp_t:dir watch;

# nyquist creates /tmp/udev_ssd.log
gen_require(
    type udev_t;
)
files_tmp_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ssd.log")
fs_tmpfs_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ssd.log")

# create /dev/harddisk1 softlink during bootup
ifdef(`crankshaft_family',`
gen_require(
    type device_t;
    type initrc_t;
    type fixed_disk_device_t;
)
filetrans_pattern(initrc_t, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
)
# restorecon under setfiles_t appends to /tmp/udev_ssd.log
gen_require(
    type setfiles_t;

```

```
)  
polaris_udev_tmp_manage(setfiles_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisboothelper.te
```

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```
#  
# August 2017, Shawn Lu  
#  
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#
```

```
policy_module(polarisnmspd, 1.0);
```

```
gen_require(  
    type polaris_nmspd_t;  
)
```

```
polaris_btrace_data_manage(polaris_nmspd_t)  
polaris_crft_data_manage(polaris_nmspd_t)  
polaris_chasfs_manage(polaris_nmspd_t)  
polaris_tdlresolve_read(polaris_nmspd_t)  
polaris_tdlldb_list_dirs(polaris_nmspd_t)  
polaris_cpld_read(polaris_nmspd_t)  
polaris_lua_read(polaris_nmspd_t)  
polaris_flashlib_read(polaris_nmspd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_nmspd_t)
```

```
polaris_db_tdlldb_dir_use(polaris_nmspd_t)
```

```
#####
```

```
# mqipc manual, one that missing in platform tdl file\n
```

```
#####
```

```
type polaris_nmspd_testclient1_mqipc_t;  
polaris_mqipc_type(polaris_nmspd_testclient1_mqipc_t)
```

```
type polaris_nmspd_testclient2_mqipc_t;  
polaris_mqipc_type(polaris_nmspd_testclient2_mqipc_t)
```

```
type polaris_testclient1_nmspd_mqipc_t;  
polaris_mqipc_type(polaris_testclient1_nmspd_mqipc_t)
```

```
type polaris_testclient2_nmspd_mqipc_t;  
polaris_mqipc_type(polaris_testclient2_nmspd_mqipc_t);
```

```

polaris_mqipc_create_name(polaris_nmospd_t, polaris_nmospd_testclient1_mqipc_t, nmospd-testclient1)
polaris_mqipc_use(polaris_nmospd_t, polaris_testclient1_nmospd_mqipc_t)

polaris_mqipc_create_name(polaris_nmospd_t, polaris_nmospd_testclient2_mqipc_t, nmospd-testclient2)
polaris_mqipc_use(polaris_nmospd_t, polaris_testclient2_nmospd_mqipc_t)

#stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_nmospd_t)
polaris_socketat_nsfs_read(polaris_nmospd_t)
# enable listen on tcp port 16113
corenet_tcp_bind_polaris_nmospd_port(polaris_nmospd_t)

allow polaris_nmospd_t self:capability dac_override;

# Allow IPC messages to Btrace Process from NMSPD Process
logging_send_syslog_msg(polaris_nmospd_t)
# Allow NMSPD to read DNS file for nameresolution
sysnet_read_config(polaris_nmospd_t)

# NMSPD uses cURL to open HTTP connections and SSL to open TLS Connections
# to DNASpaces and CMX respectively
gen_require(
    type node_t;
)
allow polaris_nmospd_t node_t:udp_socket node_bind;
allow polaris_nmospd_t self:udp_socket { bind connect getattr };
corenet_tcp_connect_http_port(polaris_nmospd_t)
polaris_odm_clnt2svr_mqipc_create(polaris_nmospd_t)

#DB persistence
polaris_tldbpersist_setup(polaris_nmospd_t)
polaris_tmp_tlddb_persist_setup(polaris_nmospd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnmospd.te
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#
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#
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#

policy_module(polarisftm, 1.0);

gen_require(
    type polaris_ftm_t;

```

```

')
polaris_chasfs_manage(polaris_ftm_t)
polaris_cpld_read(polaris_ftm_t)
polaris_flashlib_read(polaris_ftm_t)
polaris_tdlresolve_read(polaris_ftm_t)

polaris_ripc_sman_ui_serv_connect(polaris_ftm_t)

polaris_db_tdlb_dir_use(polaris_ftm_t)

logging_send_syslog_msg(polaris_ftm_t)

corecmd_exec_bin(polaris_ftm_t)
corecmd_exec_shell(polaris_ftm_t)
auth_use_nsswitch(polaris_ftm_t)

# vconfd_load_shared_schemas
polaris_confid_shared_schema_read(polaris_ftm_t)

# work with /tmp/xml
polaris_cedge_xml_tmp_manage(polaris_ftm_t)

# work with /tmp/tmp
polaris_cedge_tmp_manage(polaris_ftm_t)

polaris_cedge_reset_ns(polaris_ftm_t)

# /var/run/.ftmd-xxx sockets and pid
type polaris_ftm_var_run_t;
files_pid_file(polaris_ftm_var_run_t)
manage_files_pattern(polaris_ftm_t, polaris_ftm_var_run_t, polaris_ftm_var_run_t)
manage_sock_files_pattern(polaris_ftm_t, polaris_ftm_var_run_t, polaris_ftm_var_run_t)
files_pid_filetrans(polaris_ftm_t, polaris_ftm_var_run_t, { file sock_file })

polaris_cfgmgr_var_sock_write(polaris_ftm_t)
polaris_dbgd_var_sock_write(polaris_ftm_t)
polaris_fpm_var_sock_write(polaris_ftm_t)
polaris_ttm_var_sock_write(polaris_ftm_t)
polaris_vdaemon_var_sock_write(polaris_ftm_t)

# PLEASE LOOK AT ME: write access to /boot/hugepage.conf
# which on ultra translates into /varied/hugepage.conf access
# But no code in polaris uses it
polaris_disk_varied_manage(polaris_ftm_t)
files_manage_boot_files(polaris_ftm_t)

# fp_scaling_init calls posix_sysconf
dev_read_sysfs(polaris_ftm_t)

```

```

# vip_execute_nowait uses setpgid
allow polaris_ftm_t self:process setpgid;

polaris_cedge_tmpfs_manage(polaris_ftm_t)

# raw socket access from trace_tunnel_socket_icmp_init ftm_binos_trace.c
allow polaris_ftm_t self:rawip_socket create_socket_perms;
allow polaris_ftm_t self:capability net_raw;

# bind to ftm fnf port
corenet_udp_bind_polaris_ftm_fnf_port(polaris_ftm_t)
corenet_udp_bind_generic_node(polaris_ftm_t)

# ftm may create vrf-based netns on demand, vrf.65528
polaris_vrf_netns_manage(polaris_ftm_t)

# creates /tmp/HTX-IOX/sw-htx-service
optional_policy(
    polaris_htx_iox_tmp_manage(polaris_ftm_t)
)

# fp_scaling_read_core_count accesses cgroups file at
# /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_ftm_t)

# ftm_change_default_gw_src_ip calls ip utility
sysnet_domtrans_ifconfig(polaris_ftm_t)

# ftm process periodically call nice utility to gzip some xml file
allow polaris_ftm_t self:process setsched;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisftm.te
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#
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#

## <summary>Polaris fman_fp Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.if

```

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```
#  
# March 2017, Victor Kamensky  
#  
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#  
  
/tmp/replication(/.*)?          gen_context(system_u:object_r:polaris_repm_tmp_t,s0)
```

Found in path(s):  
\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrepm.fc  
No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
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#  
  
## <summary>Polaris Btrace Policy Rules.</summary>
```

```
#####  
# Polaris cpp (ultra)  
#####
```

```
#####  
## <summary>  
##   Work (read, write, ioctl) with /dev/cpp_dev_info and /dev/cpp_vxe_rsrc  
##   devices.  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
## <rolebase/>  
#  
interface(`polaris_cpp_dev_use',`  
  gen_require(`  
    type device_t;  
    type polaris_cpp_device_t;  
  `)  
  write_chr_files_pattern($1, device_t, polaris_cpp_device_t)  
  read_chr_files_pattern($1, device_t, polaris_cpp_device_t)  
  allow $1 polaris_cpp_device_t:chr_file map;
```

```

polaris_i95_dev_use($1
')

#####
## <summary>
##   Make the specified domain as polaris cpp process.
## </summary>
## <param name="type">
##   <summary>
##     Type to be used as a cpp process.
##   </summary>
## </param>
#
interface(`polaris_cpp_process',`
    gen_require(`
        attribute polaris_cpp_domain;
    ')

    typeattribute $1 polaris_cpp_domain;
')

#####
## <summary>
##   Make the specified domain able to use cpp /tmp files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     File name in /tmp that domains creates and other cpp process
##     access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmp_files_use',`
    gen_require(`
        type polaris_cpp_tmp_t;
    ')

    files_tmp_filetrans($1, polaris_cpp_tmp_t, file, $2)
    manage_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
    allow $1 polaris_cpp_tmp_t:file map;
')

#####

```

```

## <summary>
##   Specified domain can execute polaris_cpp_tmpfs_t code
##   which resides in /dev/shm/cpp_ucose_dram
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmpfs_exec`,`
    gen_require(`
        type polaris_cpp_tmpfs_t;
    `)

    allow $1 polaris_cpp_tmpfs_t:file execute;
`)

#####
## <summary>
##   Read write from polaris_cpp_tmpfs_t file
##   Example is ifdev shared memory /dev/shm//cpp_ifdev_shmem
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmpfs_ifdev_rw`,`
    gen_require(`
        type tmpfs_t;
        type polaris_cpp_tmpfs_t;
    `)

    rw_files_pattern($1, tmpfs_t, polaris_cpp_tmpfs_t)
    allow $1 polaris_cpp_tmpfs_t:file map;
`)

#####
## <summary>
##   Make the specified domain able to work with cpp /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_cpp_tmp_ifdev_use`,`
    gen_require(`
        type polaris_cpp_tmp_t;
    `)

    manage_fifo_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
    allow $1 polaris_cpp_tmp_t:file map;
)

#####
## <summary>
##   Make the specified domain able to getattr of /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmp_ifdev_getattr`,`
    gen_require(`
        type polaris_cpp_tmp_t;
    `)

    getattr_fifo_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
)

#####
## <summary>
##   Allow process to use Cavium SDK sysv IPC primitives
## created by octeon_pci_dmap.c. Those could be created either
## by cpp_driver (usually) or by cpp_cdm on utah and overlord,
## and by cm_fp on neptune.
##
## </summary>
## <param name="type">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cavium_sdk_ipc_use`,`
    ifdef(`crankshaft_family`,`
        polaris_cpp_driver_sem_use($1)
    `)
)

```

```

        polaris_cpp_driver_shm_use($1)
optional_policy(
    polaris_cpp_cdm_sem_use($1)
    polaris_cpp_cdm_shm_use($1)
)
optional_policy(
    polaris_cm_fp_sem_use($1)
    polaris_cm_fp_shm_use($1)
)

    # allow scan pci/devices proc dir
    kernel_getattr_proc_files($1)
    kernel_write_proc_files($1)
    kernel_read_system_state($1)
)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/i95 devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i95_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_i95_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_i95_device_t)
    read_chr_files_pattern($1, device_t, polaris_i95_device_t)
    allow $1 polaris_i95_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, map) with sysfs files required
##   by cavium library in o2_cavm_mem_map.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cavium_dma_map`,`

```

```

gen_require(
    type sysfs_t;
)

mmap_files_pattern($1, sysfs_t, sysfs_t)
dev_rw_sysfs($1)
)

#####
## <summary>
##   Manage /dev/shm files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_cpp_tmpfs_manage`,
gen_require(
    type polaris_cpp_tmpfs_t;
    type tmpfs_t;
)

fs_tmpfs_filetrans($1, polaris_cpp_tmpfs_t, file)
manage_files_pattern($1, tmpfs_t, polaris_cpp_tmpfs_t)
allow $1 polaris_cpp_tmpfs_t:file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpp.if  
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```

#
# March 2017, Victor Kamensky
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#

```

```

## <summary>Polaris bt_logger Policy Rules.</summary>

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.if  
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```

#

```

# August 2017, Shawn Lu

#

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#

# /bootflash labels

```
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?     gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/.ssh/ssh_host.*_key     gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/tan(/.*)?         gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/core(/.*)?       gen_context(system_u:object_r:polaris_core_file_t,s0)
/bootflash/debug.conf        gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/bootflash/packages.conf     gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

# /csl\_p\_0

```
/csl_p_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

# /csl\_p\_1.context

```
/csl_p_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

# /csl\_s\_0.context

```
/csl_s_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
```

# /csl\_s\_1.context

```
/csl_s_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
```

# /obfl is separate on qwlc

```
/obfl(/.*)?            gen_context(system_u:object_r:polaris_obfl_data_t,s0)
```

# /varied

```
/varied(/.*)?          gen_context(system_u:object_r:polaris_disk_varied_t,s0)
/varied/.install_info   gen_context(system_u:object_r:polaris_vwlcinstall_info_t,s0)
/varied/obfl.*          gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/varied/grub_cisco_version  gen_context(system_u:object_r:polaris_grubver_t,s0)
/varied/grub(/.*)?      gen_context(system_u:object_r:boot_t,s0)
/varied/grub2(/.*)?     gen_context(system_u:object_r:polaris_grub_bios_t,s0)
/varied/grub/menu.*     gen_context(system_u:object_r:bootloader_etc_t, s0)
/sbin/grub*             gen_context(system_u:object_r:bootloader_exec_t,s0)
```

# /grubenv

```
/bootefi(/.*)?         gen_context(system_u:object_r:polaris_grub_efi_t, s0)
```

# hanet driver used by vwlc and ultra, is there better place for it?

```
/dev/hanet -c gen_context(system_u:object_r:polaris_hanet_device_t,s0)
```

```

# from /lib/tmpfiles.d/binos-vxe.conf
/lic0 -l          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/lic1 -l          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /harddisk labels (qwlc)
/vol/harddisk(/.*)?      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/vol/harddisk/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/tan(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/core(/.*)?     gen_context(system_u:object_r:polaris_core_file_t,s0)
/vol/harddisk/debug.conf     gen_context(system_u:object_r:polaris_debug_conf_t,s0)

# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /dev/epa device on qwlc
/dev/epa[0-9]*      -c gen_context(system_u:object_r:polaris_epa_device_t,s0)
/dev/epactrl[0-9]*  -c gen_context(system_u:object_r:polaris_epa_device_t,s0)

# /dev/luna_fpga on qwlc
/dev/luna_mbfpga    -c gen_context(system_u:object_r:polaris_luna_mbfpga_device_t,s0)

# /dev/astro on qwlc
/dev/astro          -c gen_context(system_u:object_r:polaris_astro_device_t,s0)

# /dev/cpp_il on qwlc
/dev/cpp_il         -c gen_context(system_u:object_r:polaris_cpp_il_device_t,s0)

# /flash is symbolic link to /bootflash on qwlc
/flash              gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /dev/oob_evfc on qwlc
/dev/oob_evfc      -c gen_context(system_u:object_r:polaris_oob_evfc_device_t,s0)

# /dev/sfp-ktr on katar
/dev/sfp-ktr       -c gen_context(system_u:object_r:polaris_sfp_katar_device_t,s0)

# To store tcpdump output in file haIntCaptureLo.pcap
/bootflash/haIntCaptureLo.pcap  gen_context(system_u:object_r:polaris_netutils_data_t,s0)
/objstore(/.*)?      gen_context(system_u:object_r:polaris_disk_objstore_t,s0)

# /config labels
/config(/.*)?        gen_context(system_u:object_r:polaris_disk_config_t,s0)
/config/.ssh(/.*)?   gen_context(system_u:object_r:ssh_home_t,s0)
/config/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:ssh_key_t,s0)
/config/.ssh/ssh_host.*_key      gen_context(system_u:object_r:ssh_key_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswlc.fc

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dnl

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dnl

dnl WLC Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(`fp', `elasic', BPROC\_ODM, 1)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(`fp', `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(`rp', `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(`cc', `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(`fp', `elasic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(`rp', `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(`cc', `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(`fp', `elastic', BPROC\_WNCD, 7)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/vwlcmaps.m4

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#

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#

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#

policy\_module(polariswebui, 1.0);

type polaris\_webui\_file\_t;

files\_type(polaris\_webui\_file\_t)

polaris\_pfile\_type(polaris\_webui\_file\_t)

polaris\_process\_domain\_template(webui\_lighttpd)

```
polaris_process_domain_template(webui)
```

```
gen_require(  
    type initrc_t;  
)  
manage_dirs_pattern(initrc_t, polaris_webui_file_t, polaris_webui_file_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswebui.te

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```
#  
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#
```

```
policy_module(polariscmrp, 1.0);
```

```
gen_require(  
    type polaris_cm_rp_t;  
)
```

```
polaris_btrace_data_manage(polaris_cm_rp_t)  
polaris_crft_data_manage(polaris_cm_rp_t)  
polaris_chasfs_manage(polaris_cm_rp_t)  
polaris_tdlresolve_read(polaris_cm_rp_t)  
polaris_tdlldb_list_dirs(polaris_cm_rp_t)  
polaris_cpld_read(polaris_cm_rp_t)  
polaris_lua_read(polaris_cm_rp_t)  
polaris_flashlib_read(polaris_cm_rp_t)  
polaris_flashlib_write(polaris_cm_rp_t)  
#  
# cm_rp opens log file to collect required RP, CC, FP and rommon details  
# and write into /vol/harddisk/.inv/inv_log_file  
# This file is accessed by crashinfo collecting script and others  
type polaris_cm_rp_inv_log_file_t;  
polaris_disk_type(polaris_cm_rp_inv_log_file_t)  
polaris_cm_rp_inv_log_setup(polaris_cm_rp_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_cm_rp_t)
```

```
polaris_cpld_dev_use(polaris_cm_rp_t)  
polaris_lfts_dev_use(polaris_cm_rp_t)  
polaris_proc_rmonbifo_read(polaris_cm_rp_t)  
polaris_obfl_data_read(polaris_cm_rp_t)
```

```

polaris_db_tdlldb_dir_use(polaris_cm_rp_t)
# cman_rp needs read access to cpu identity
# /dev/cpu/0/msr
dev_read_cpuid(polaris_cm_rp_t)
allow polaris_cm_rp_t self:capability { sys_rawio dac_override chown sys_resource };

allow polaris_cm_rp_t self:process setsched;

# on ultra read eeprom through i2c
# type=AVC msg=audit(1479569571.044:3): avc: denied { getattr } for pid=5283 comm="cmand"
path="/sys/devices/i2c-0/i2c-1/1-0056/eeprom" dev="sysfs" ino=25556
scontext=system_u:system_r:polaris_cm_rp_t:s0 tcontext=system_u:object_r:sysfs_t:s0 tclass=file
# type=AVC msg=audit(1479569571.045:4): avc: denied { read write } for pid=5283 comm="cmand"
name="eeprom" dev="sysfs" ino=25556 scontext=system_u:system_r:polaris_cm_rp_t:s0
tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_rw_sysfs(polaris_cm_rp_t)

polaris_ggpio_dev_read_write(polaris_cm_rp_t)

# accessing obfl files like /obfl/obfl_uptime_v2.log
polaris_bootflash_read(polaris_cm_rp_t)
polaris_obfl_data_manage(polaris_cm_rp_t)

corecmd_exec_shell(polaris_cm_rp_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_cm_rp_t)

# cman_data_chasfs_mgmt_eth_override (cman/rp/src/cman_data.c:1096) tries to do
# ioctl(sk, SIOCGIFHWADDR, &ifr) for "eth2", which is not present on ultra, but
# such ioctl in kernel triggers dev_load attempt in kernel. Since interface
# and module does exist anyway, it is OK to deny it
kernel_dontaudit_request_load_module(polaris_cm_rp_t)

# cmand creates udp socket to get interface hw address cmlib_if_config_addr
allow polaris_cm_rp_t self:udp_socket create_socket_perms;

# dyncfg_setup.sh is started by cmand
polaris_dyncfg_domtrans(polaris_cm_rp_t)
polaris_dyncfg_tmp_read(polaris_cm_rp_t)
# on crankshaft cm_rp does init directly
polaris_dyncfg_setup(polaris_cm_rp_t)

# denied { search read open } subject: polaris_cm_rp_t; object: polaris_disk_varied_t
# name="/" dev="sda5"; path="/varied"
polaris_disk_varied_manage(polaris_cm_rp_t)

```

```

#allow polaris_cm_rp_t polaris_udev_tmp_files_t.dir { read search };
polaris_udev_tmp_list_dirs(polaris_cm_rp_t)

# LOOK AT ME: /tmp/rp/chasfs/inventory has symbolic links back to
# /bootflash/core/modules and /bootflash/tracelogs/modules cman_inv_restart_init
# calls chasfs_properties_internal over this node and as result it tries to
# access those directories
polaris_core_file_search(polaris_cm_rp_t)
polaris_disk_bootflash_search(polaris_cm_rp_t)
polaris_btrace_persistent_data_search(polaris_cm_rp_t)

polaris_dyncfg_tmp_manage(polaris_cm_rp_t)

ifdef(^mcp_family',`
polaris_scooby_dev_use(polaris_cm_rp_t)
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
polaris_spa_dev_use(polaris_cm_rp_t)
`)

# temporary files created for repm in /tmp/replication
type polaris_cm_rp_tmp_t;
files_tmp_file(polaris_cm_rp_tmp_t)
gen_require(
    type tmp_t;
)
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pfu_overtime.lock")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "golden_boot")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "sr_message_debug.txt")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "ngwc_sudi_auth_done")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "codesign.txt")
polaris_cm_rp_tmp_manage(polaris_cm_rp_t)

logging_send_syslog_msg(polaris_cm_rp_t)

# work with /dev/i2c devices
polaris_i2c_use(polaris_cm_rp_t)
dev_getattr_sysfs_fs(polaris_cm_rp_t)

# /var files
gen_require(
    type var_log_t;
)
type polaris_cm_rp_var_log_t;
logging_log_file(polaris_cm_rp_var_log_t)

```

```

logging_log_filetrans(polaris_cm_rp_t, polaris_cm_rp_var_log_t, file, "obfl_uptime_v2.log")
manage_files_pattern(polaris_cm_rp_t, var_log_t, polaris_cm_rp_var_log_t)

# needed for "show platform hardware slot R0 eobc interface primary status"
kernel_read_network_state(polaris_cm_rp_t)

#####
# show platform hardware slot R0 pcie status
# mcp_pcie_status_cmd.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_pcie_status_cmd.sh
#####

polaris_utility_domain_template(pcie_status_cmd)

polaris_bexecute_domtrans(polaris_cm_rp_t)
polaris_bexecute_domain(polaris_pcie_status_cmd_t, polaris_pcie_status_cmd_exec_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pcie_status_cmd_t)

# "lspci" needs access to files like /sys/devices/pci0000:00/0000:00:00.0/resource
dev_read_sysfs(polaris_pcie_status_cmd_t)

polaris_send_signal_to_bexecute(polaris_cm_rp_t)

# need write/getattr access for pipes like "pipe:[118396]"
polaris_cmrp_use_fifo(polaris_pcie_status_cmd_t)

corecmd_exec_bin(polaris_pcie_status_cmd_t)

# on utah need to get model info
optional_policy(`
    polaris_dash_dev_use(polaris_cm_rp_t)
    polaris_nios_dev_use(polaris_cm_rp_t)
`)

#access to /dev/dash_fpga device on fugazi platform
ifdef(^fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_cm_rp_t)
`)

ifdef(^crankshaft_family',`
    polaris_quack_dev_use(polaris_cm_rp_t)
`)

ifdef(^sparrow_platform',`
    polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
`)

```

```

ifdef(`blackheart_platform',`
polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
')

ifdef(`cabo_platform',`
polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
')

ifdef(`aventus_platform',`
polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
polaris_dio_dev_use(polaris_cm_rp_t)
')

ifdef(`qwlc_platform',`
polaris_quack_dev_use(polaris_cm_rp_t)
')

ifdef(`katar_platform',`
polaris_quack_dev_use(polaris_cm_rp_t)
')

ifdef(`wlc_family',`
netutils_domtrans_ping(polaris_cm_rp_t)
')

ifdef(`ngwc_family',`
# In cman_rp module fips/entropy component
# calls cman_ngwc_tam_platform_get_act2_entropy() to
# retrieve entropy from ACT2 chip.
polaris_act2_dev_use(polaris_cm_rp_t)

# cman-rp init needs access to quack chip
polaris_quack_dev_use(polaris_cm_rp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_cm_rp_t)

#on macallan and nyquist cman_rp needs to access /flash<#>/lic0/sudi_cert_data_v3
polaris_disk_license_read(polaris_cm_rp_t)

#on macallan and starfleet cli "show firmware version lan_spi" triggers ethtool usage
sysnet_domtrans_ifconfig(polaris_cm_rp_t)
')

# cman-rp needs to read /tmp/fed_post_result and /tmp/sm_post_result
# on ngwc platforms
optional_policy(`

```

```

polaris_fed_tmp_files_read(polaris_cm_rp_t)
')
optional_policy(
polaris_sif_mgr_tmp_files_read(polaris_cm_rp_t)
')

ifdef(^starfleet_platform',`
polaris_dmammap_dev_use(polaris_cm_rp_t)
')

ifdef(^nyquist_platform',`
polaris_ngwc_shm_manage(polaris_cm_rp_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_cm_rp_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)

files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "mcu_upgrading")

# executes tar for microcode
allow polaris_cm_rp_t self:capability { fowner fsetid };
')

ifdef(^radium_platform',`
# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)
')

ifdef(^sumatra_platform',`
# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_cm_rp_t)
# access huron FPGA
polaris_huron_dev_use(polaris_cm_rp_t)
')

ifdef(^quake_platform',`
polaris_ngwc_shm_manage(polaris_cm_rp_t)

# /dev/dmammap usage

```

```

polaris_dmammap_dev_use(polaris_cm_rp_t)

files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "mcu_upgrading")
')

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvm48950 is fixed using CSCvm48953
#ifdef(`nyquist_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
')

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn64182 is fixed using CSCvn64184
#ifdef(`quake_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
')

#####
# CLI: "show platform hardware slot R0 xaui statistics"
# this results in cman (/usr/binos/bin/cmand) invoking
# "/bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/dash_fpga_xaui.py show".
# The python script dash_fpga_xaui.py runs in polaris_bexecute_t domain
# and as part of its functionality it needs to create an UDP socket and make an ioctl call.
#####

polaris_utility_domain_template(dash_fpga_xaui)

polaris_bexecute_domain(polaris_dash_fpga_xaui_t, polaris_dash_fpga_xaui_exec_t)
polaris_cmrp_use_fifo(polaris_dash_fpga_xaui_t)
allow polaris_dash_fpga_xaui_t self:udp_socket { create ioctl };

#####
# CLI: show plat soft cpu share
# - invokes functions in binos/tools/bin/cgroup_reports.sh
# - also cman_cli_show_cpu_share_cb in binos/cman/rp/src/cman_cli.c
# allow open/read/search cgroup files like
# /sys/fs/cgroup/cpu,cpuacct/iosxe_control_processes/cpu.shares
#####
fs_read_cgroup_files(polaris_cm_rp_t)
fs_list_cgroup_dirs(polaris_cm_rp_t)

# on tsn need access to /dev/moka_fpga
optional_policy(`
polaris_mokafpga_dev_use(polaris_cm_rp_t)
')

```

```

optional_policy(`
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_rp_t)
`)

# on tsn read access to /sys/devices/platform/moka_fpga
optional_policy(`
polaris_mokafpga_read(polaris_cm_rp_t)
`)

optional_policy(`
polaris_tam_getattrs_tmp_dirs(polaris_cm_rp_t)
`)

# on vwlc/macallan, cmand creates /tmp/hw_entropy
polaris_hw_entropy_create(polaris_cm_rp_t)

# on tsn need write access to
# sys/devices/platform/cpld/reg_rp_sku_register
# on starfleet need write access to
# sys/devices/platform/cpld/reg_fan_fault_shutdown
optional_policy(`
polaris_cpld_write(polaris_cm_rp_t)
`)

# LOOK AT ME: /dev/mem access restriction
ifdef(`tsn_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
`)

# reads from, populates chasfs with values and deletes /tmp/package_biv_sums
polaris_kgv_data_manage(polaris_cm_rp_t)

optional_policy(`
    polaris_quake_i2c_manage(polaris_cm_rp_t)
`)

ifdef(`qwlc_platform',`
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
`)

ifdef(`katar_platform',`
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
# Read access to /tmp/ldwm_envelope file
polaris_ldwm_envelope_read(polaris_cm_rp_t)
`)

```

```

)

ifdef(^mcp_family',`
# Read access to /tmp/ldwm_envelope file
polaris_ldwm_envelope_read(polaris_cm_rp_t)
`)

# /dev/luna_fpga on qwlc
optional_policy(`
polaris_luna_mbfpga_dev_use(polaris_cm_rp_t)
`)

# open /dev/ttyS0
term_use_unallocated_ttys(polaris_cm_rp_t)

optional_policy(`
polaris_ngwc_scc_shm_manage(polaris_cm_rp_t)
`)

ifdef(^ngwc_family',`
# on nyquist in ngwc_update_member_config nvram_config is
# copied from /tmp/chassis/local/rp/tam/00001.nvram_config
polaris_nvram_manage(polaris_cm_rp_t)
# CMAN needs to create nvram_config with the right label instead of bootflash_t
gen_require(`
    type polaris_nvram_file_t;
    type polaris_disk_bootflash_t;
`)
filetrans_pattern(polaris_cm_rp_t, polaris_disk_bootflash_t, polaris_nvram_file_t, file, "nvram_config")
`)

# CMANRP needs to create right label instead of bootflash_t
type polaris_user_file_t;
files_type(polaris_user_file_t);
polaris_bootflash_filetrans(polaris_cm_rp_t, polaris_user_file_t, file);
manage_files_pattern(polaris_cm_rp_t, polaris_disk_bootflash_t, polaris_user_file_t)

# on virtual platforms cman reads virtual sudi file /csl_p_0/vudi.pri
ifdef(^vxe_family',`
polaris_disk_csl_read(polaris_cm_rp_t)
`)
ifdef(^wlc_family',`
polaris_disk_csl_read(polaris_cm_rp_t)
`)

# from cman_util_chasfs_watch_stby_harddisk
polaris_udev_tmp_watch(polaris_cm_rp_t)

```

```

# watch read over /tmp/chassis/local/rp/tam by cman_nyq_board_auth_init
polaris_chasfs_watch_read(polaris_cm_rp_t)

# /dev/aikido access
polaris_aikido_dev_use(polaris_cm_rp_t)

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(
polaris_serdes_asic_key_tmp_manage(polaris_cm_rp_t)
)

# run /sbin/hwclock in its own domain
clock_domtrans(polaris_cm_rp_t)

ifdef(`crankshaft_family',`
# modprobe sm_nim_adpt.ko for Switzer-CC
modutils_domtrans_insmod(polaris_cm_rp_t)
# /dev/sm_nim_adpt device files for Switzer-CC
polaris_sm_nim_adpt_dev_use(polaris_cm_rp_t)

# "show platform hardware subslot <slot/card> backplane statistics"
# triggers ethtool with ifconfig_t using fifo_file (pipe) on polaris_cm_rp_t.
gen_require(
    type ifconfig_t;
)

polaris_cmrp_use_fifo(ifconfig_t)
)

polaris_iosd_vcpu_read(polaris_cm_rp_t)

#####
# show platform hardware slot R0 fpga
# mcp_fpga_status_cmd.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_fpga_status_cmd.sh
#####

polaris_utility_domain_template(fpga_status_cmd)

polaris_bexecute_domtrans(polaris_cm_rp_t)
polaris_bexecute_domain(polaris_fpga_status_cmd_t, polaris_fpga_status_cmd_exec_t)
polaris_cmrp_use_fifo(polaris_fpga_status_cmd_t)

auth_use_nsswitch(polaris_fpga_status_cmd_t)
corecmd_exec_bin(polaris_fpga_status_cmd_t)

# PLEASE LOOK AT ME: /sys/devices/platform/nios should have Cisco specific label
# read content under /sys/devices/platform/nios

```

```

dev_read_sysfs(polaris_fpga_status_cmd_t)

#ifdef(`sparrow_platform',`
polaris_dio_dev_use(polaris_cm_rp_t)
')

#ifdef(`cabo_platform',`
polaris_dio_dev_use(polaris_cm_rp_t)
')

#ifdef(`starfleet_platform',`
polaris_fpga_upgrade_tmp_use(polaris_cm_rp_t)
')

type polaris_fpga_upgrade_tmp_t;
files_tmp_file(polaris_fpga_upgrade_tmp_t)
files_tmp_filetrans(polaris_cm_rp_t, polaris_fpga_upgrade_tmp_t, file, "fpga_upgrade")
# cman_rp needs read access to cpu identity
# /dev/cpu/0/msr
dev_read_cpuid(polaris_cm_rp_t)

# cman_rp needs read/write access to cpu msr
# /dev/cpu/0/msr
# following definition provides that
dev_rw_cpu_microcode(polaris_cm_rp_t)

type polaris_cmrp_nim_xxd_tmp_t;
files_tmp_file(polaris_cmrp_nim_xxd_tmp_t)
files_tmp_filetrans(polaris_cm_rp_t, polaris_cmrp_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_cm_rp_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)

#ifdef(`2kp_platform',`
# blzi device
polaris_blzi_dev_use(polaris_cm_rp_t)
')

#tamlib debug file access
polaris_tamlib_dbg_file_manage(polaris_cm_rp_t)

#ifdef(`wlc_family',`
# tcpdump access for RP
# packet dump is stored in file /bootflash/haIntCaptureLo.pcap
type polaris_netutils_data_t;
polaris_pfile_type(polaris_netutils_data_t)
gen_require(
    type polaris_disk_bootflash_t;
    type netutils_t;
)

```

```

filetrans_pattern(netutils_t, polaris_disk_bootflash_t, polaris_netutils_data_t, file, "haIntCaptureLo.pcap")
manage_files_pattern(netutils_t, polaris_netutils_data_t, polaris_netutils_data_t)

# tcpdump access
netutils_run(polaris_cm_rp_t, system_r)

# pidof access
dev_read_sysfs(polaris_cm_rp_t)
kernel_read_system_state(polaris_cm_rp_t)
domain_read_all_domains_state(polaris_cm_rp_t)

# /usr/sbin/ethtool access for show platform hardware slot x ha_port interface stats command
sysnet_domtrans_ifconfig(polaris_cm_rp_t)
')

optional_policy(`
polaris_ds31408_dev_use(polaris_cm_rp_t)
')

polaris_ddr_dev_use(polaris_cm_rp_t)

# allow /usr/sbin/smartctl to be operated on fsadm_exec_t
fstools_exec(polaris_cm_rp_t)

# allow access to /tmp/cmlib_eeprom_sim_smartctl.out
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "cmlib_eeprom_sim_smartctl.out")

# allow access to /dev/nvme*
dev_nvme_chr_files_manage(polaris_cm_rp_t)
dev_nvme_blk_files_manage(polaris_cm_rp_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_cm_rp_t)
polaris_tmp_tdlldb_persist_setup(polaris_cm_rp_t)

#code_sign_verify is started by cmand
polaris_code_verify_domtrans(polaris_cm_rp_t)

ifdef(`ngwc_family',`
# SELINUX Mismatch warning when doing power redundancy configuration commands
# Allow access /bootflash/nplusm-power
polaris_nplusm_power_manage(polaris_cm_rp_t)
')

ifdef(`crankshaft_family',`
# For USB disable feature, /sys/bus/usb/drivers/usb/*/authorized is accessed
gen_require(`
type sysfs_t;

```

```
)  
allow polaris_cm_rp_t sysfs_t:file create;  
dev_manage_sysfs_dirs(polaris_cm_rp_t)  
)
```

```
ifdef(`petra_platform',`  
#allow access to /dev/petra-fpga  
polaris_iots_fpga_dev_use(polaris_cm_rp_t)  
#allow access to /flash6/moncfg/cfg.dat  
polaris_nvram_read(polaris_cm_rp_t)  
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmrp.te

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```
dnl  
dnl April 2018, Victor Kamensky  
dnl  
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dnl  
divert(-1)
```

```
include(`polaris_process.m4')  
dnl Stub out plaris process  
define(`polaris_process',`')
```

```
dnl Stub out mqipc  
define(`polaris_mqipc_service_server',`')  
define(`polaris_mqipc_service_client',`')  
define(`polaris_mqipc_service_server_elastic_client',`')
```

```
dnl Stub out lipc  
define(`polaris_lipc_service_server',`')  
define(`polaris_lipc_service_client',`')
```

```
include(`polaris_ipc_ripc.m4')  
include(`polaris_ipc_base_ripc_if.m4')
```

```
dnl Stub out non existent one  
define(`polaris_websocket_service_server',`')  
define(`polaris_cipc_service_server',`')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl  
#
```

```
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
## <summary>Polaris Platform Base IPC Policy Rules.</summary>
## <required val="true">
##   Needed for each polaris platform
## </required>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_if.m4
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```

```
#
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#
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#
```

```
policy_module(polarisplogd, 1.0);
```

```
gen_require(`
    type polaris_plogd_t;
`)
```

```
polaris_btrace_data_manage(polaris_plogd_t)
polaris_crft_data_manage(polaris_plogd_t)
polaris_chasfs_manage(polaris_plogd_t)
polaris_tdlresolve_read(polaris_plogd_t)
polaris_tdlldb_list_dirs(polaris_plogd_t)
polaris_cpld_read(polaris_plogd_t)
polaris_flashlib_read(polaris_plogd_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_plogd_t)
```

```
# originally when box starts /dev/log is symbolic link to /run/systemd/journal/dev-log
# but latter plogd reset links to its own socket: make sure that we have proper
# transition
```

```
gen_require(`
    type devlog_t;
    type syslogd_t;
`)
```

```
allow polaris_plogd_t devlog_t:sock_file manage_sock_file_perms;
allow polaris_plogd_t devlog_t:lnk_file manage_lnk_file_perms;
dev_filetrans(polaris_plogd_t, devlog_t, sock_file, "log")
# make sure that unix_dgram_socket got transitioned into syslogd_t
type_transition polaris_plogd_t polaris_plogd_t:unix_dgram_socket syslogd_t;
allow polaris_plogd_t syslogd_t:unix_dgram_socket { bind create read };
```

```

# autogen script misses connection between plogd
polaris_ripc_plog_serv_connect(polaris_plogd_t)

# why plogd needs dac_override capability?
allow polaris_plogd_t self:capability { dac_override };
allow polaris_plogd_t self:capability2 block_suspend;

polaris_dynconf_tmp_read(polaris_plogd_t)

# plogd calls journalctl -f to get system logs including our AVC messages
# plogd also signals running journalctl to manage the buffer queues
gen_require(
    type journalctl_t;
)
journalctl_domtrans(polaris_plogd_t)
allow polaris_plogd_t journalctl_t:process signal;

# should be moved into contrib journalctl.te? journalctl tries to read
# /proc/1/environ
gen_require(
    type journalctl_t;
)
init_read_state(journalctl_t)
allow journalctl_t self:capability sys_resource;
allow journalctl_t self:process setrlimit;

# plogd calls stdbuf to set up journalctl buffering
corecmd_exec_bin(polaris_plogd_t)

# writes into pman fifo stdout
polaris_use_btrace_fifo(journalctl_t)

# /dev/log is symbolic link to /run/systemd/journal/dev-log
# need ability to search in init_var_run_t /run/systemd
# some of subjects that use syslog may not have it
gen_require(
    attribute syslog_client_type;
)
init_search_pid_dirs(syslog_client_type)
#plog_d calls journalctl to get system log including AVC message.
allow polaris_plogd_t journalctl_t:process signal;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplogd.te
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#

```

```
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#
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#
```

```
# polaristamsrp file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristamsrp.fc
```

```
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```

```
#
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#
```

```
## <summary>Polaris ftm Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Write ttm /var/run socket file
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ftm_var_sock_write`,`
```

```
gen_require(`
```

```
type polaris_ftm_t;
```

```
type polaris_ftm_var_run_t;
```

```
type var_run_t;
```

```
`)
```

```
write_sock_files_pattern($1, var_run_t, polaris_ftm_var_run_t)
```

```
allow $1 polaris_ftm_t:unix_stream_socket { connectto };
```

```
`)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisftm.if
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
```

```
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#

/usr/binos/conf/iptables.sh -- gen_context(system_u:object_r:polaris_iptbl_exec_t,s0)

/tmp/rp/iptables -d gen_context(system_u:object_r:polaris_iptbl_tmp_t,s0)
/tmp/rp/iptables/inot_fifo -p gen_context(system_u:object_r:polaris_iptbl_tmp_t,s0)

# in polaris we have xtables-multi at wrong location
/usr/bin/xtables-multi -- gen_context(system_u:object_r:iptables_exec_t,s0)

#fman (rp/fp) acl mgmt and iptbl modules dependency
/tmp/iptables.v4          gen_context(system_u:object_r:polaris_iptbl_tmp_t,s0)
/tmp/iptables.v6          gen_context(system_u:object_r:polaris_iptbl_tmp_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiptables.fc
No license file was found, but licenses were detected in source scan.

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## <summary>Polaris cpp_sp Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppsp.if
No license file was found, but licenses were detected in source scan.

#
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#
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#

# polarisngwctblmgr file contexts place holder

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.fc
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#
# March 2017, Victor Kamensky
```

```

#
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#

/tmp/sysctrl_i2c.lck          gen_context(system_u:object_r:polaris_cm_rp_tmp_t,s0)
/tmp/pfu_overtime.lock       gen_context(system_u:object_r:polaris_cm_rp_tmp_t,s0)
/tmp/golden_boot             gen_context(system_u:object_r:polaris_cm_rp_tmp_t,s0)

# dash_fpga_xaui.py is the backend python code for
# the cli "show platform hardware slot R0 xaui statistics"
/usr/binos/conf/dash_fpga_xaui.py -- gen_context(system_u:object_r:polaris_dash_fpga_xaui_exec_t,s0)

/usr/binos/bin/cmand_us -- gen_context(system_u:object_r:polaris_cm_rp_exec_t,s0)
# relabel /vol/harddisk/.inv
/vol/harddisk/.inv(/.*)?     gen_context(system_u:object_r:polaris_cm_rp_inv_log_file_t,s0)
/vol/harddisk_internal/.inv(/.*)? gen_context(system_u:object_r:polaris_cm_rp_inv_log_file_t,s0)

# .inv dir is in /bootflash in Katar eWLC
/bootflash/.inv(/.*)?       gen_context(system_u:object_r:polaris_cm_rp_inv_log_file_t,s0)

/usr/binos/conf/mcp_fpga_status_cmd.sh -- gen_context(system_u:object_r:polaris_fpga_status_cmd_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmrp.fc
No license file was found, but licenses were detected in source scan.

#
# August 2017, Shawn Lu
#
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#

## <summary>Polaris rrm_mgr Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.if
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#

## <summary>Polaris LIPC Policy Rules.</summary>

```

```

#####
# LPC policy
#####

#####
## <summary>
##   Manage lipc files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lipc_manage',`
gen_require(
  type polaris_lipc_t;
)
  manage_dirs_pattern($1, polaris_lipc_t, polaris_lipc_t)
  manage_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  manage_lnk_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  manage_fifo_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  manage_sock_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
)

#####
## <summary>
##   Getattr of lipc files directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lipc_getattr',`
gen_require(
  type polaris_lipc_t;
)
  getattr_dirs_pattern($1, polaris_lipc_t, polaris_lipc_t)
  getattr_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  getattr_lnk_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  getattr_fifo_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
  getattr_sock_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
)

```

```

#####
## <summary>
##   Create lipc file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed creating lipc channel.
##   </summary>
## </param>
## <param name="channel_domain">
##   <summary>
##     Domain assigned to lipc channel.
##   </summary>
## </param>
## <param name="channel_name">
##   <summary>
##     File name of lipc channel.
##   </summary>
## </param>
#
interface(`polaris_lipc_create_name`,
  gen_require(
    type polaris_lipc_t;
  )
  type_transition $1 polaris_lipc_t : sock_file $2 $3;
  manage_sock_files_pattern($1, polaris_lipc_t, $2)

  polaris_socketat_nsfs_read($1)

#   not specific enough
#   type_transition $1 $1 : unix_stream_socket $2;
#   allow $1 $2:unix_stream_socket { listen accept bind create write read };
)

#####
## <summary>
##   Write lipc file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to connect and write into lipc file.
##   </summary>
## </param>
## <param name="channel_domain">
##   <summary>
##     Domain assigned to lipc channel.

```

```
## </summary>
## </param>
## <param name="server">
## <summary>
## Domain of owner of lipc channel.
## </summary>
## </param>
#
```

```
interface(`polaris_lipc_write`,`
gen_require(`
type polaris_lipc_t;
`)
write_sock_files_pattern($1, polaris_lipc_t, $2)
allow $1 $3:unix_stream_socket { connectto };

polaris_socketat_nsfs_read($1)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislipc.if
```

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dnl

```
define(`polaris_lipc_service_server_aux',`dnl
```

```
type $1;
```

```
files_type($1)
```

```
polaris_lipc_$2_create_name($3)')
```

```
define(`polaris_lipc_service_server_full',`dnl
```

```
polaris_lipc_service_server_aux(lipc_label($1), lipc_stem($1), process_label($2))dnl
```

```
')
```

```
define(`polaris_lipc_service_server',`dnl
```

```
ifelse(lipc_type_map($1), `', `polaris_lipc_service_server_full($1, $2)')
```

```
lipc_type_map_set(lipc_label($1), process_label($2))
```

```
')
```

```
define(`polaris_lipc_service_client_aux',`dnl
```

```
polaris_lipc_$2_write($3, $4)')
```

```
define(`polaris_lipc_service_client',`dnl
```

```
polaris_lipc_service_client_aux(lipc_label($1), lipc_stem($1), process_label($2), lipc_type_map(lipc_label($1)))dnl
```

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_lipc\_te.m4

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#

# September 2017, Victor Kamensky

#

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#

policy\_module(polarisbtman, 1.0);

gen\_require(^

type polaris\_btman\_t;

)

polaris\_crft\_data\_manage(polaris\_btman\_t)

polaris\_chasfs\_manage(polaris\_btman\_t)

polaris\_tdlresolve\_read(polaris\_btman\_t)

polaris\_tdlldb\_list\_dirs(polaris\_btman\_t)

polaris\_cpld\_read(polaris\_btman\_t)

polaris\_flashlib\_read(polaris\_btman\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_btman\_t)

polaris\_db\_tdlldb\_dir\_use(polaris\_btman\_t)

polaris\_bexecute\_domtrans(polaris\_btman\_t)

# script starts rsync with mcp\_chvrf.sh

polaris\_chvrf\_domtrans(polaris\_btman\_t)

polaris\_send\_signal\_to\_bexecute(polaris\_btman\_t)

corecmd\_exec\_bin(polaris\_btman\_t)

corecmd\_exec\_shell(polaris\_btman\_t)

# allow read of /etc/group and /etc/passwd

auth\_use\_nsswitch(polaris\_btman\_t)

allow polaris\_btman\_t self:capability { dac\_override fsetid };

polaris\_cpld\_read(polaris\_btman\_t)

# operate on all btrace files

polaris\_btrace\_data\_manage\_all(polaris\_btman\_t)

```

# btman operated on /tmp/tmppub files
type polaris_btrace_tmppub_t;
files_tmp_file(polaris_btrace_tmppub_t)

polaris_systemd_tmpfiles_tmp_filetrans(polaris_btrace_tmppub_t, dir, "tmppub")
filetrans_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t, { file dir })
manage_files_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
manage_dirs_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)

polaris_persistent_read(polaris_btman_t)

# in purge_old_core_files_from_harddisk function of btrace_rotate_util.c
# script removes outdated core files, so it needs read/write permission
# to polaris_core_file_t files.
polaris_core_file_manage(polaris_btman_t)

fs_getattr_xattr_fs(polaris_btman_t)

# btman checks for presence of /tmp/udev/etc/udev/harddisk
# through hwutil_is_harddisk_present function of hwutil-common.sh
polaris_udev_tmp_list_dirs(polaris_btman_t)

# when /bootflash or /harddisk are 100% full
allow polaris_btman_t self:capability sys_resource;

# access to /tmp/sw/boot/dmesg
polaris_boot_tmp_read(polaris_btman_t)

polaris_create_ldb_domtrans(polaris_btman_t)

# btman calls update_resolver_luid_paths which eventually calls open_brand function for
# given polaris executable (build_crdu_luid_file_paths, bcrdu_get_proc_path_internal,
# brand_type_string)
polaris_read_exec_domain(polaris_btman_t)

# btman create transitional files in /tmp directory
type polaris_btman_tmp_t;
files_tmp_file(polaris_btman_tmp_t)
files_tmp_filetrans(polaris_btman_t, polaris_btman_tmp_t, file)
manage_files_pattern(polaris_btman_t, polaris_btman_tmp_t, polaris_btman_tmp_t)

# use syslog
logging_send_syslog_msg(polaris_btman_t)

# btman unlink /tmp/rp/pvp/work/btman_first_inst
polaris_pvp_manage_tmp_files(polaris_btman_t)

```

```

# operate on btrace file in /bootflash
polaris_btrace_persistent_data_manage(polaris_btman_t)

gen_require(
    type polaris_btrace_data_t;
)
polaris_bootflash_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_harddisk_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_crashinfo_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_bootflash_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tan")
polaris_harddisk_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tan")

# btman creates /tmp/rp//pvp/work/btman_first_inst directory in is_first_incarnation
# function called by btrace_rotate_init
polaris_pvp_manage_tmp_files(polaris_btman_t)

#####
# This block is policies for "request platform software system shell" CLI

# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/bin/btman -f rp
#             -s /tmp/rp/trace/stage -w /tmp/rp/trace
# - needs to read/getattr on
#   /tmp/sw/mount/*universalk9.*.SSA.pkg/usr/binos/sbin/in.telnetd
gen_require(
    type telnetd_exec_t;
)
allow polaris_btman_t telnetd_exec_t:file { getattr open read };

# btman establishes leases for trace files
allow polaris_btman_t self:capability lease;

# dump_btrace_meta walks all files with nftw
files_getattr_all_files(polaris_btman_t)
files_getattr_all_dirs(polaris_btman_t)
files_read_all_symlinks(polaris_btman_t)
files_list_non_security(polaris_btman_t)
files_read_all_files(polaris_btman_t)
files_mmap_all_files(polaris_btman_t)

# btman exports data through http protocol btm_trigger_export and schedule_newfile_export
corenet_tcp_connect_http_port(polaris_btman_t)

# LOOK AT ME: incorrect iosd-tps service_def. It should be renamed
# iosd_tps_socket-b0 in all platform.tdl files. Remove the following
# policy when CSCvp89498 is fixed.
gen_require(
    type polaris_lipc_t;
    type polaris_pman_t;

```

```

')
polaris_lipc_write(polaris_btman_t, polaris_lipc_t, polaris_pman_t)

# btman manages some persistent crashinfo files
polaris_disk_crashinfo_manage(polaris_btman_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_btman_t)

polaris_tmp_tdlldb_persist_setup(polaris_btman_t)

polaris_btrace_data_watch(polaris_btman_t)

# dump_btrace_meta writes to /tmp/binary_trace.1605747053/.pkginfo
polaris_install_tmp_manage(polaris_btman_t)

#allow polaris_btman_t access to polaris_cm_rp semaphore
polaris_cm_rp_sem_use(polaris_btman_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtman.te
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisfmanrp, 1.0);

gen_require(^
    type polaris_fman_rp_t;
)

#####
# mqipc manual, one that missing in platform tdl file
#####

# mq.-fman-log-bay0-peer0
type polaris_fman_log_bay0_peer0_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer0_mqipc_t)

# mq.-fman-log-bay0-peer1
type polaris_fman_log_bay0_peer1_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer1_mqipc_t)

```

```
# mq.-fman-log-bay0-peer2
type polaris_fman_log_bay0_peer2_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer2_mqipc_t)

# mq.-fman-log-bay0-peer3
type polaris_fman_log_bay0_peer3_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer3_mqipc_t)

# mq.-fman-log-bay0-peer4
type polaris_fman_log_bay0_peer4_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer4_mqipc_t)

# mq.-fman-log-bay0-peer5
type polaris_fman_log_bay0_peer5_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer5_mqipc_t)

# mq.-fman-log-bay0-peer6
type polaris_fman_log_bay0_peer6_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer6_mqipc_t)

# mq.-fman-log-bay0-peer7
type polaris_fman_log_bay0_peer7_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer7_mqipc_t)

# mq.-fman-log-bay0-peer8
type polaris_fman_log_bay0_peer8_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer8_mqipc_t)

polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer0_mqipc_t, fman-log-bay0-peer0)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer1_mqipc_t, fman-log-bay0-peer1)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer2_mqipc_t, fman-log-bay0-peer2)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer3_mqipc_t, fman-log-bay0-peer3)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer4_mqipc_t, fman-log-bay0-peer4)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer5_mqipc_t, fman-log-bay0-peer5)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer6_mqipc_t, fman-log-bay0-peer6)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer7_mqipc_t, fman-log-bay0-peer7)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer8_mqipc_t, fman-log-bay0-peer8)

polaris_btrace_data_manage(polaris_fman_rp_t)
polaris_crft_data_manage(polaris_fman_rp_t)
polaris_chasfs_manage(polaris_fman_rp_t)
polaris_tdlresolve_read(polaris_fman_rp_t)
polaris_tdlldb_list_dirs(polaris_fman_rp_t)
polaris_cpld_read(polaris_fman_rp_t)
polaris_flashlib_read(polaris_fman_rp_t)
polaris_lua_read(polaris_fman_rp_t)

polaris_ripc_sman_ui_serv_connect(polaris_fman_rp_t)
```

```

polaris_db_tdlldb_dir_use(polaris_fman_rp_t)

ifdef(`nyquist_platform',`
gen_require(`
    type polaris_bt_logger_fman_rp_mqipc_t;
`)
# fman_rp may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_bt_logger_fman_rp_mqipc_t, bt_logger_fman-rp)
`)

allow polaris_fman_rp_t self:udp_socket { create ioctl };

allow polaris_fman_rp_t self:capability { dac_override };
allow polaris_fman_rp_t self:capability2 block_suspend;

# not clear why fman_rp tries to load netdev-mgmtbr kernel module
# it does not exist on ultra anyway
# type=AVC msg=audit(1478126742.967:98): avc: denied { module_request } for pid=18020 comm="fman_rp"
kmod="netdev-mgmtbr" scontext=system_u:system_r:polaris_fman_rp_t:s0
tcontext=system_u:system_r:kernel_t:s0 tclass=system
kernel_request_load_module(polaris_fman_rp_t)

polaris_socketat_nsfs_read(polaris_fman_rp_t)

polaris_dyncfg_tmp_read(polaris_fman_rp_t)

# socketat usage from fman_punt_port_mapping_init for AF_NETLINK, SOCK_DGRAM
polaris_lfts_dev_use(polaris_fman_rp_t)
allow polaris_fman_rp_t self:netlink_tcpdiag_socket { create nlmsg_read };

# fman_rp tries to write to sytemd journal when a peer is stuck
# introduced by CSCvt19772
logging_send_syslog_msg(polaris_fman_rp_t)

optional_policy(`
#fman-rp creates tmp files in acl-mgmt workflow.
polaris_fman_acl_iptbl_tmp_file(polaris_fman_rp_t)
`)

# manually create mqipc channel: missing in TDL
type polaris_fm2fpm_mqipc_t;
polaris_mqipc_type(polaris_fm2fpm_mqipc_t)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fm2fpm_mqipc_t, fm2fpm_vulcan_mqipc)

optional_policy(`
polaris_fm2fpm_mqipc_use(polaris_fman_rp_t)
`)

```

```
polaris_issu_tmp_files_read(polaris_fman_rp_t)
```

```
polaris_install_tmp_read(polaris_fman_rp_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.te
```

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```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
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```

```
#
```

```
policy_module(polarisrifmgr, 1.0);
```

```
gen_require(`
```

```
    type polaris_rif_mgr_t;
```

```
`)
```

```
polaris_btrace_data_manage(polaris_rif_mgr_t)
```

```
polaris_crft_data_manage(polaris_rif_mgr_t)
```

```
polaris_chasfs_manage(polaris_rif_mgr_t)
```

```
polaris_tdlresolve_read(polaris_rif_mgr_t)
```

```
polaris_tdlldb_list_dirs(polaris_rif_mgr_t)
```

```
polaris_cpld_read(polaris_rif_mgr_t)
```

```
polaris_lua_read(polaris_rif_mgr_t)
```

```
polaris_flashlib_read(polaris_rif_mgr_t)
```

```
polaris_lfts_dev_use(polaris_rif_mgr_t)
```

```
logging_send_syslog_msg(polaris_rif_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_rif_mgr_t)
```

```
allow polaris_rif_mgr_t self:capability { sys_nice dac_override };
```

```
allow polaris_rif_mgr_t self:process { setsched };
```

```
# open /dev/ttyS0 console in sco_sys_init_sw_params
```

```
term_use_unallocated_ttys(polaris_rif_mgr_t)
```

```
# work with /dev/hanet device
```

```
polaris_hanet_dev_use(polaris_rif_mgr_t)
```

```
# update/read chassis serial numer /csl_p_0/vudi.pri
```

```
polaris_disk_csl_manage(polaris_rif_mgr_t)
```

```
# monitors native interfaces flap over /proc and netlink
```

```
kernel_read_network_state(polaris_rif_mgr_t)
```

```

allow polaris_rif_mgr_t self:netlink_route_socket rw_netlink_socket_perms;
allow polaris_rif_mgr_t self:unix_dgram_socket create_socket_perms;

# pidof and /proc usage
dev_read_sysfs(polaris_rif_mgr_t)
kernel_read_system_state(polaris_rif_mgr_t)
domain_read_all_domains_state(polaris_rif_mgr_t)

corecmd_exec_bin(polaris_rif_mgr_t)

kernel_dontaudit_request_load_module(polaris_rif_mgr_t)
# rifmgr creates udp socket to get interface flags in rif_rp_init
allow polaris_rif_mgr_t self:udp_socket create_socket_perms;

corenet_tcp_bind_polaris_rif_mgr_port(polaris_rif_mgr_t)
corenet_tcp_connect_polaris_rif_mgr_port(polaris_rif_mgr_t)

corenet_udp_bind_polaris_rif_mgr_port(polaris_rif_mgr_t)
corenet_udp_bind_generic_node(polaris_rif_mgr_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.te
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#
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#
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#

## <summary>Polaris stack_mgr Policy Rules.</summary>
#####
## <summary>
## Read and write all stack mgr's fifo file, used as
##   standard input/output.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_stack_mgr_fifo',`
gen_require(`
type polaris_stack_mgr_t;
`)

```

```
write_fifo_files_pattern($1, polaris_stack_mgr_t, polaris_stack_mgr_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.if

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```
#
# April 2017, Victor Kamensky
#
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#
```

```
/tmp/.DMI_FIFO          gen_context(system_u:object_r:polaris_dmi_vtyserverutild_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmi\_vtyserverutild.fc

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```
#
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#
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#
```

```
## <summary>Polaris cm_cc Policy Rules.</summary>
```

```
#####
```

```
## <summary>
##   Execute cmand_fp in the polaris_cm_fp_t domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
```

```
interface(`polaris_cm_cc_domtrans`,
  gen_require(`
    type polaris_cm_cc_t, polaris_cm_cc_exec_t;
  `)
)
```

```
corecmd_search_bin($1)
domtrans_pattern($1, polaris_cm_cc_exec_t, polaris_cm_cc_t)
')
```

```
#####
## <summary>
##   Manage cm_cc_tmpfs files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cm_cc_tmpfs_manage`,`
    gen_require(`
        type polaris_cm_cc_tmpfs_t;
    `)

    manage_files_pattern($1, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
    mmap_files_pattern($1, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)
```

```
#####
## <summary>
##   Check presence and unlink /tmp/nim_xxd_present file created by cman cc.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_nim_xxd_tmp_open_unlink`,`
    gen_require(`
        type polaris_nim_xxd_tmp_t;
    `)

    allow $1 polaris_nim_xxd_tmp_t:file { open unlink }
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcc.if

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```
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#
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```

```

#

## <summary>Polaris LUA Policy Rules.</summary>

#####
# Polaris lfts
#####

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dev_lfts device.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lfts_dev_use`,`
gen_require(`
    type device_t;
    type polaris_lfts_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_lfts_device_t)
    read_chr_files_pattern($1, device_t, polaris_lfts_device_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislfts.if

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```

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#

```

```

## <summary>Polaris ofa Policy Rules.</summary>

```

Found in path(s):

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```

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# March 2017, Victor Kamensky
#

```

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#

/var/virtual-instance(/.\*)? gen\_context(system\_u:object\_r:polaris\_var\_vman\_t,s0)

/bootflash/virtual-instance(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/bootflash/virtual-instance.conf -- gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/bootflash/vman\_fdb(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/vol/harddisk/virtual-instance(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/vol/harddisk/virtual-instance.conf -- gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/vol/harddisk/vman\_fdb(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

#sparrow, blackheart

/flash1/virtual-instance(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/flash1/virtual-instance.conf -- gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/flash1/vman\_fdb(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_vman\_t,s0)

/tmp/vman(/.\*)? gen\_context(system\_u:object\_r:polaris\_vman\_tmp\_t,s0)

/tmp/cgroup.log gen\_context(system\_u:object\_r:polaris\_vman\_tmp\_t,s0)

/tmp/vman\_lxc\_wdt\_[0-9]\* gen\_context(system\_u:object\_r:polaris\_vman\_tmp\_t,s0)

/tmp/trace(/.\*)? gen\_context(system\_u:object\_r:polaris\_vman\_tmp\_t,s0)

/usr/binos/conf/vman\_exec.sh -- gen\_context(system\_u:object\_r:polaris\_vman\_shell\_exec\_t,s0)

/usr/binos/conf/cgroup\_reports.sh -- gen\_context(system\_u:object\_r:polaris\_cgroup\_reports\_exec\_t,s0)

/usr/binos/conf/vman\_techsupport.sh -- gen\_context(system\_u:object\_r:polaris\_vman\_tech\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvman.fc

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#

# August 2017, Shawn Lu

#

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#

policy\_module(polarisodmproxy, 1.0);

```
gen_require(  
    type polaris_odm_proxy_t;  
)
```

polaris\_btrace\_data\_manage(polaris\_odm\_proxy\_t)

polaris\_crft\_data\_manage(polaris\_odm\_proxy\_t)

```
polaris_chasfs_manage(polaris_odm_proxy_t)
polaris_tdlresolve_read(polaris_odm_proxy_t)
polaris_tdlldb_list_dirs(polaris_odm_proxy_t)
polaris_cpld_read(polaris_odm_proxy_t)
polaris_lua_read(polaris_odm_proxy_t)
polaris_flashlib_read(polaris_odm_proxy_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_odm_proxy_t)
```

```
polaris_db_tdlldb_dir_use(polaris_odm_proxy_t)
```

```
#allow to setrlimit
allow polaris_odm_proxy_t self:capability sys_resource;
allow polaris_odm_proxy_t self:process setrlimit;
allow polaris_odm_proxy_t self:capability dac_override;
```

```
polaris_odm_clnt2svr_mqipc_create(polaris_odm_proxy_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.te
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2017, Victor Kamensky
#
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#

## <summary>Polaris issu_monitor Policy Rules.</summary>
#####
## <summary>
## Execute issumonitor in the polaris_issu_monitor domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_issu_monitor_domtrans',`
gen_require(`
type polaris_issu_monitor_t, polaris_issu_monitor_exec_t;
`)

domtrans_pattern($1, polaris_issu_monitor_exec_t, polaris_issu_monitor_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.if

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dnl May 2018, Victor Kamensky

dnl

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dnl

dnl Place holder to let selinux-policy makefile know that this module

dnl is autogenerated, but we have different rules for it

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.fc.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.te.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.if.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.te.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.fc.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.te.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.if.in

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.if.in

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polariskeyman, 1.0);

gen\_require(`

type polaris\_keyman\_t;

`)

polaris\_btrace\_data\_manage(polaris\_keyman\_t)

polaris\_crft\_data\_manage(polaris\_keyman\_t)

polaris\_chasfs\_manage(polaris\_keyman\_t)

polaris\_tdlresolve\_read(polaris\_keyman\_t)

polaris\_tdlldb\_list\_dirs(polaris\_keyman\_t)

polaris\_flashlib\_read(polaris\_keyman\_t)

polaris\_rpc\_sman\_ui\_serv\_connect(polaris\_keyman\_t)

allow polaris\_keyman\_t self:capability net\_admin;

# keyman utilizes secure memory via ciscossl libcrypto.so (mlock)

```

allow polaris_keyman_t self:capability ipc_lock;
polaris_cpld_read(polaris_keyman_t)

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`quake_platform',`
dev_read_sysfs(polaris_keyman_t)
')

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`supernova_platform',`
dev_read_sysfs(polaris_keyman_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariskeyman.te

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```

#
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#
```

```
# polaristamdrp file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamdrp.fc

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```

#
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#
```

```
# /bootflash labels
```

```

/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?    gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/.ssh/ssh_host.*_key      gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/tan(/.*)?          gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/core(/.*)?        gen_context(system_u:object_r:polaris_core_file_t,s0)
/bootflash/debug.conf        gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/bootflash/packages.conf     gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

```

# /vol/bootflash4 labels
/vol/bootflash4(/.*)?      gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/vol/bootflash4/csl_p_0(/.*)?  gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/vol/bootflash4/csl_p_1(/.*)?  gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/vol/bootflash4/csl_s_0(/.*)?  gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/vol/bootflash4/csl_s_1(/.*)?  gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/vol/bootflash4/obfl_*      gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /harddisk labels
/vol/harddisk(/.*)?      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/vol/harddisk_internal(/.*)?  gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/vol/harddisk/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/tan(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)
/vol/harddisk/debug.conf     gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/vol/harddisk_internal/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk_internal/tan(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk_internal/core(/.*)?  gen_context(system_u:object_r:polaris_core_file_t,s0)
/vol/harddisk/packages.conf  gen_context(system_u:object_r:polaris_packages_conf_t,s0)
# on 1ng persistent storage arranged differently
/csl_p_0(/.*)?      gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_p_1(/.*)?      gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_s_0(/.*)?      gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/csl_s_1(/.*)?      gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/obfl(/.*)?      gen_context(system_u:object_r:polaris_obfl_data_t,s0)

/vol/disk0(/.*)?      gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# scooby device
/dev/scooby -c gen_context(system_u:object_r:polaris_scooby_device_t,s0)

# spa devices handled by sys_platform driver
/dev/spa0 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa1 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa2 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa3 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/iocp0 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)

# htdp devices
/dev/htdp[0-9]* -c gen_context(system_u:object_r:polaris_htdp_device_t,s0)

# /dev/epa device on asr1k(mcp)
/dev/epa[0-9]*      -c gen_context(system_u:object_r:polaris_epa_device_t,s0)
/dev/epactrl[0-9]*  -c gen_context(system_u:object_r:polaris_epa_device_t,s0)

```

```

# /dev/luna_fpga on asr1k(mcp)
/dev/luna_mbfpga -c gen_context(system_u:object_r:polaris_luna_mbfpga_device_t,s0)

# /dev/dash_fpga device on fugazi(mcp)
/dev/dash_fpga -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc0 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)

# /dev/astro on asr1k(mcp)
/dev/astro -c gen_context(system_u:object_r:polaris_astro_device_t,s0)

# /dev/oob_evfc on asr1k(mcp)
/dev/oob_evfc -c gen_context(system_u:object_r:polaris_oob_evfc_device_t,s0)

# /dev/cpp_il on asr1k(mcp)
/dev/cpp_il -c gen_context(system_u:object_r:polaris_cpp_il_device_t,s0)

/dev/icp_adf_ctl -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_adf_gige_wd -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_csr -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_ring -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem_page -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

/dev/ds31408 -c gen_context(system_u:object_r:polaris_ds31408_device_t,s0)
/dev/cbdma -c gen_context(system_u:object_r:polaris_cbdma_device_t,s0)
/dev/cpp_htdp -c gen_context(system_u:object_r:polaris_cpp_htdp_device_t,s0)
/dev/n2_device -c gen_context(system_u:object_r:polaris_n2_device_t,s0)
/dev/cy2213 -c gen_context(system_u:object_r:polaris_cy2213_device_t,s0)

/dev/vega -c gen_context(system_u:object_r:polaris_vega_device_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcp.fc

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dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^max_bay_map', `defn(format(``max_bay_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^max_bay_map_set', `define(format(``max_bay_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^max_elastic_map', `defn(format(``max_elastic_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^max_elastic_map_set', `define(format(``max_elastic_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^max_scope_map', `ifelse($2, `elastic', `max_elastic_map($1, $2, $3)', `max_bay_map($1, $2)'))
```

```
dnl RICP scope handling
```

```
define(^min_bay_ripc_map', `defn(format(`min_bay_ripc_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^min_bay_ripc_map_set', `define(format(`min_bay_ripc_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^min_elastic_ripc_map', `defn(format(`min_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^min_elastic_ripc_map_set', `define(format(`min_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^min_scope_ripc_map_aux', `ifelse($2, `elastic', `min_elastic_ripc_map($1, $2, $3)', `min_bay_ripc_map($1, $2)'))')
```

```
define(^min_scope_ripc_map', `ifelse(min_scope_ripc_map_aux($1, $2, $3), `', 0, min_scope_ripc_map_aux($1, $2, $3))')
```

```
define(^max_bay_ripc_map', `defn(format(`max_bay_ripc_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^max_bay_ripc_map_set', `define(format(`max_bay_ripc_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^max_elastic_ripc_map', `defn(format(`max_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^max_elastic_ripc_map_set', `define(format(`max_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^max_scope_ripc_map_aux', `ifelse($2, `elastic', `max_elastic_ripc_map($1, $2, $3)', `max_bay_ripc_map($1, $2)'))')
```

```
define(^max_scope_ripc_map', `ifelse(max_scope_ripc_map_aux($1, $2, $3), `', 0, max_scope_ripc_map_aux($1, $2, $3))')
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_max_scope.m4
```

```
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```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris periodic Policy Rules.</summary>
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisperiodic.if
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# December 2019, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

#

## <summary>Polaris service\_mgr Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaris servicemgr.if

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polariscommon, 1.0);

#####

# Polaris common

#####

# domain that holds all polaris processes

attribute polaris\_domain;

# domain that holds all polaris processes executables

attribute polaris\_exec\_domain;

# domain that holds all polaris processes plus few base types that operates on

# during system start, like initrc\_t and unconfined\_service\_t. Please remove

# unconfined types latter.

attribute polaris\_extended\_domain;

gen\_require(`

type unconfined\_t;

type unconfined\_service\_t;

type initrc\_t;

type init\_t;

')

typeattribute unconfined\_t polaris\_extended\_domain;

typeattribute unconfined\_service\_t polaris\_extended\_domain;

typeattribute initrc\_t polaris\_extended\_domain;

typeattribute init\_t polaris\_extended\_domain;

# common permissions that are safe to grant and hard to root cause.

# these permissions may need to be turned off during development or tightened

# in future releases

gen\_require(`

attribute domain;

```

)
# sys_resource denial is seen due to disk full issue
# and possibly FD exceeding limit
allow domain self:capability sys_resource;

# When management interface is enabled for development Polaris device can be
# access by telnet, which directly drops into shell. It would be desirable
# to remove telnet functionality at all. But for now we need transition
# rule to get shell running in unconfined domain.
gen_require(
    type telnetd_t;
)

unconfined_shell_domtrans(telnetd_t)

#####
# This block is policies for "request platform software system shell" CLI.
# Execute bexecute in polaris_bexecute domain.
polaris_bexecute_domtrans(telnetd_t)

# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/sbin/in.telnetd
# -L /usr/binos/conf/brelay.sh
# - this needs read/write/create access to /tmp/rp/trace/.in_telnetd_*.bin.tmp
# which later gets renamed to /tmp/rp/trace/telnetd_service_sh_*.bin
polaris_btrace_data_manage(telnetd_t)
# mcp_telnetd_init through btrace_application_start calls get_chassis_number
# so it needs chasfs access
polaris_chasfs_read(telnetd_t)
polaris_cpld_read(telnetd_t)
polaris_btrace_lv1_config_manage(telnetd_t)
#####

# LOOK AT ME: rsync needs sys_admin capability
# only seen when we boot in enforcing mode, localtime glibc library call
# needs time zone information and through __tz_convert function it eventually
# calls syspage function and that in turns calls Cisco syspage related
# prctl that is protected by CAP_ADMIN now
gen_require(
    type rsync_t;
)
allow rsync_t self:capability sys_admin;

# mount_packages.sh systemd unit runs under init_t and it leaks unix socket
gen_require(
    type rsync_t;
    type init_t;
)
allow rsync_t init_t:unix_stream_socket getattr;

```

```

# LOOK AT ME: auditd needs sys_admin capability
# only seen when we boot in enforcing mode, denials happens upon exec of
# auditdsp why is not entirely clear
gen_require(
    type auditd_t;
)
allow auditd_t self:capability sys_admin;

# LOOK AT ME:
# Because Cisco kernel features check for capability sys_admin
# before granting access to it. It turns out to be mistake because
# in SELinux universe being root does not mean one have sys_admin
# capability. For now grant sys_admin capability to everyone :(
gen_require(
    attribute domain;
)
allow domain self:capability sys_admin;

# LOOK AT ME:
# all polaris SMU system is based on LD_LIBRARY_PATH passing from
# parent to child, but if auxv AT_SECURE would be set to 1, glibc
# will clean LD_LIBRARY_PATH and other environment variables when
# it execute another process. We need to grant noatsecure to all
# processes
gen_require(
    attribute domain;
)
allow domain domain:process { noatsecure rlimitinh };

# nfs server exporting some directories like /harddisk
gen_require(
    type nfsd_t;
)
polaris_disk_bootflash_read_inh(nfsd_t)
polaris_harddisk_read(nfsd_t)

# nfs server check hugetlbfs files system
gen_require(
    type hugetlbfs_t;
)
list_dirs_pattern(nfsd_t, hugetlbfs_t, hugetlbfs_t)

# temporarily addressing denial,
# preferable to turn on nfs_export_all_rw/ro boolean
gen_require(
    type removable_t;
)

```

```

list_dirs_pattern(nfsd_t, removable_t, removable_t)

# firmware type
type polaris_firmware_t;
files_type(polaris_firmware_t)

# some systemd unit creates /firmware directory in initramfs
gen_require(
    attribute domain;
    type root_t;
)
filetrans_pattern(domain, root_t, polaris_firmware_t, dir, "firmware")

# handling /tmp/debug.conf, created by systemd unit
gen_require(
    type polaris_debug_conf_t;
    type unconfined_service_t;
)
files_tmp_filetrans(unconfined_service_t, polaris_debug_conf_t, {file lnk_file}, "debug.conf")

# /tmp/etc files; serving as /etc like but sitting in mutable storage
# (assuming that real /etc would become read-only eventually)
type polaris_etc_t;
files_type(polaris_etc_t);

# /tmp/sv files
type polaris_sv_tmp_t;
files_tmp_file(polaris_sv_tmp_t)

# /dev/i2c-N
type polaris_i2c_device_t;
dev_node(polaris_i2c_device_t)

# remap_mem0 device
type polaris_remap_mem_device_t;
dev_node(polaris_remap_mem_device_t)

type polaris_ebf_t;
files_type(polaris_ebf_t)

# allow all domains map/read ebf files
gen_require(
    attribute domain;
)
polaris_ebf_map(domain)

# btrace files for telnetd, since telnetd is open source label
# and it does not use our domain creation template

```

```

gen_require(
    type telnetd_t;
)
type polaris_telnetd_bt_t;
polaris_btrace_data_type(polaris_telnetd_bt_t)
polaris_btrace_data_client(telnetd_t, polaris_telnetd_bt_t)

type polaris_telnetd_maroon_t;
polaris_maroon_data_type(polaris_telnetd_maroon_t)
polaris_maroon_data_client(telnetd_t, polaris_telnetd_maroon_t)

#####
# "install add file" on ULTRA invokes:
# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/sbin/in.telnetd -L /usr/binos/conf/brelay.sh
# That needs getattr on /lib/systemd/system/ksm.service
polaris_ksm_run_check(telnetd_t)

# restorecon needs sys_resource capability
gen_require(
    type setfiles_t;
)
allow setfiles_t self:capability sys_resource;

# accessing /sys/firmware/dmi/tables/DMI
gen_require(
    type dmidecode_t;
    type sysfs_t;
)
mmap_files_pattern(dmidecode_t, sysfs_t, sysfs_t)
gen_require(
    type dmidecode_t;
    type memory_device_t;
)
allow dmidecode_t memory_device_t:chr_file map;
# called by confd_t label with it is file as stdin
polaris_confd_tmp_use_fifo(dmidecode_t)

# rpcbind binds to port
gen_require(
    type rpcbind_t;
)
corenet_udp_bind_generic_port(rpcbind_t)

# when polaris_unconfined we need to mark all subject labels except
# iosd lable to run as unconfined
#ifdef(^polaris_unconfined')
    gen_require(
        type auditd_t;

```

```

    type dhcpc_t;
    type getty_t;
    type inetd_t;
    type initrc_t;
    type init_t;
    type journalctl_t;
    type nfsd_t;
    type ntpd_t;
    type rpcbind_t;
    type rpcd_t;
    type rsync_t;
    type setfiles_t;
    type sshd_t;
    type syslogd_t;
    type system_dbusd_t;
    type udev_t;
    type virtd_t;
    type virtlogd_t;
    type ldconfig_t;
    type hostname_t;
)
unconfined_domain(auditd_t)
unconfined_domain(dhcpc_t)
unconfined_domain(getty_t)
unconfined_domain(inetd_t)
unconfined_domain(initrc_t)
unconfined_domain(init_t)
unconfined_domain(journalctl_t)
unconfined_domain(nfsd_t)
unconfined_domain(ntpd_t)
unconfined_domain(rpcbind_t)
unconfined_domain(rpcd_t)
unconfined_domain(rsync_t)
unconfined_domain(setfiles_t)
unconfined_domain(sshd_t)
unconfined_domain(syslogd_t)
unconfined_domain(system_dbusd_t)
unconfined_domain(udev_t)
unconfined_domain(vird_t)
unconfined_domain(virtlogd_t)
unconfined_domain(ldconfig_t)
unconfined_domain(hostname_t)
)

#ifdef(^polaris_unconfined',`
optional_policy(`
    gen_require(`
        type container_runtime_t;

```

```

    ')
    unconfined_domain(container_runtime_t)
  ')
)

# /tmp/rsync_log_dir files
type polaris_rsync_tmp_t;
files_tmp_file(polaris_rsync_tmp_t)

# activate correct named transition for basic directories
# when code runs under unconfined_service_t, i.e calls ip
# command that runs under ifconfig_t and creates /run/netns
gen_require(
  type unconfined_service_t;
)
domain_named_filetrans(unconfined_service_t)
gen_require(
  type ifconfig_t;
  type ifconfig_var_run_t;
)
allow ifconfig_t ifconfig_var_run_t:dir mounton;

# earlier invocation of ifconfig complains about tmp_t mounton
# on /sys directory
gen_require(
  type tmp_t;
)
allow ifconfig_t tmp_t:dir mounton;

#SERDES library stores info in /tmp/serdes_asic_key_dir/*
type polaris_serdes_asic_key_tmp_t;
files_tmp_file(polaris_serdes_asic_key_tmp_t)

# /dev/shm/vrf_shm access
type polaris_vrf_shm_t;
files_type(polaris_vrf_shm_t)

# /dev/shm/cerrno_dll access
type polaris_cerr_shm_t;
files_tmpfs_file(polaris_cerr_shm_t)

# for /sbin/ip: /dev/shm/vrf_shm access in netns creation
gen_require(
  type ifconfig_t;
)
polaris_vrf_shm_manage(ifconfig_t)

# for /sbin/ip: adds lfts device in netns creation

```

```

polaris_lfts_dev_use(ifconfig_t)

# new systemd-tmpfiles needs this permissions
gen_require(
    type systemd_tmpfiles_t;
)
allow systemd_tmpfiles_t self:capability sys_resource;
allow systemd_tmpfiles_t self:process setrlimit;

gen_require(
    type unconfined_service_t;
)
ssh_initrc_domtrans(unconfined_service_t)

#wlc awips
type polaris_awips_signature_file_t;
polaris_pfile_type(polaris_awips_signature_file_t)

# /usr/bin/curl
type polaris_curl_t;
type polaris_curl_exec_t;
init_system_domain(polaris_curl_t, polaris_curl_exec_t)
corenet_udp_bind_generic_node(polaris_curl_t)
auth_use_nsswitch(polaris_curl_t)
polaris_crft_data_read(polaris_curl_t)

# for ip netns exec X curl
optional_policy(
    polaris_curl_domtrans(ifconfig_t)
)

# /etc/init.d/sshd that runs under initrc_t through ssh-keygen
# creates /config/.ssh directory if does not exist; /config
# directory is typically symlink to /bootflash
gen_require(
    type initrc_t;
    type ssh_home_t;
)
polaris_bootflash_filetrans(initrc_t, ssh_home_t, dir, ".ssh")

# /tmp/ldwm_envelope file
type polaris_ldwm_envelope_tmp_t;
files_tmp_file(polaris_ldwm_envelope_tmp_t)
gen_require(
    type initrc_t;
    type init_t;
)
files_tmp_filetrans({ initrc_t init_t }, polaris_ldwm_envelope_tmp_t, file, "ldwm_envelope")

```

```
#####
# CLI: show platform software tech-support
#####
polaris_utility_domain_template(tech_support)
polaris_bexecute_domain(polaris_tech_support_t, polaris_tech_support_exec_t)
polaris_bexecute_domtrans(polaris_tech_support_t)

# allow to run readlink -f /usr/binos/conf/psimple.sh
corecmd_exec_bin(polaris_tech_support_t)

# Additional policies needed for workflow
auth_use_nsswitch(polaris_tech_support_t)
dev_list_sysfs(polaris_tech_support_t)
polaris_chasfs_read(polaris_tech_support_t)
polaris_cpld_read(polaris_tech_support_t)
# scripts stdin is set by hman and needs access to pipes like pipe:[271524]
polaris_hman_use_fifo(polaris_tech_support_t)
# Allow ls to /tmp/ufs/crashinfo
optional_policy(
    polaris_ncd_tmp_read(polaris_tech_support_t)
)

# Allow readlink to /usb0 and /usb1
optional_policy(
    fs_read_removable_symlinks(polaris_tech_support_t)
)

gen_require(
    type polaris_btrace_tmppub_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_crashinfo_t;
)

# platform_tech_support.sh creates misc files/dirs under /tmp/tmppub
type polaris_tech_support_tmp_t;
files_tmp_file(polaris_tech_support_tmp_t)
filetrans_pattern(polaris_tech_support_t, polaris_btrace_tmppub_t, polaris_tech_support_tmp_t, { file dir })
# misc file directly in /tmp like /tmp/esg_tech_support_command_file_out.txt
files_tmp_filetrans(polaris_tech_support_t, polaris_tech_support_tmp_t, file,
"esg_tech_support_command_file_out.txt")
files_tmp_filetrans(polaris_tech_support_t, polaris_tech_support_tmp_t, file,
"sdwan_tech_support_command_file_out.txt")
manage_files_pattern(polaris_tech_support_t, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)
manage_dirs_pattern(polaris_tech_support_t, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)

# /bootflash/certs
type polaris_ap_cert_file_t;
```

```

files_type(polaris_ap_cert_file_t)
polaris_pfile_type(polaris_ap_cert_file_t)

# Additional policies needed for workflow when file option is used
# show platform software tech-support file bootflash:show_tech_file
polaris_bootflash_manage(polaris_tech_support_t)
polaris_disk_crashinfo_manage(polaris_tech_support_t)
fs_getattr_tmpfs(polaris_tech_support_t)
polaris_btrace_persistent_data_read(polaris_tech_support_t)

type polaris_rommon_info_tmp_t;
files_tmp_filetrans(initrc_t, polaris_rommon_info_tmp_t, file, "existing_rommon_info")
manage_files_pattern(initrc_t, polaris_rommon_info_tmp_t, polaris_rommon_info_tmp_t)
fs_associate_tmpfs(polaris_rommon_info_tmp_t)

# tmlib debug file
type polaris_tmlib_dbg_file_t;
polaris_pfile_type(polaris_tmlib_dbg_file_t)

# read /proc/cmdline
kernel_read_system_state(polaris_tech_support_t)
# read rmonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_tech_support_t)
# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_read(polaris_tech_support_t)

# /dev/ddr
type polaris_ddr_device_t;
dev_node(polaris_ddr_device_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscommon.te
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dnl
dnl April 2018, Victor Kamensky
dnl
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dnl
dnl Ripc Base Interface Map: track that type declations unique
define(^rip_base_type_map', `defn(format(`^rip_base_type_map[%s]", ` $1'))')
define(^rip_base_type_map_set', `define(format(`^rip_base_type_map[%s]", ` $1'), ` $2'))

define(^rip_base_port_map', `defn(format(`^rip_base_port_map[%s]", ` $1'))')
define(^rip_base_port_map_set', `define(format(`^rip_base_port_map[%s]", ` $1'), ` $2'))

define(^polaris_ripc_portcon', portcon tcp $1 gen_context(system_u:object_r:$2,s0))

```

```

define(`polaris_ripcon_portcon_aux',`dnl
ifelse(ripcon_base_port_map($1),`,`,`polaris_ripcon_portcon($1, $2)')
ripcon_base_port_map_set($1, $2)
')

define(`polaris_ripcon_portcon_many',
`polaris_ripcon_portcon_aux(eval($2 + $3), $1)
ifelse($4, $3, `', `polaris_ripcon_portcon_many($1, $2, eval($3 + 1), $4)')')

define(`polaris_ripcon_service_server_aux',`dnl
type $1, port_type, defined_port_type;
$4
')

define(`polaris_ripcon_service_server_full',`dnl
polaris_ripcon_service_server_aux(ripcon_label($1), ripcon_stem($1), process_label($2),
polaris_ripcon_portcon_many(ripcon_label($1), $5, min_scope_ripcon_map($3, $4, $2),
max_scope_ripcon_map($3, $4, $2)))
')

define(`polaris_ripcon_service_server',`dnl
ifelse(ripcon_base_type_map($1), `', `polaris_ripcon_service_server_full($1, $2, $3, $4, $5)')
ripcon_base_type_map_set($1, 1)
')

define(`polaris_ripcon_service_client',`dnl
ifelse(ripcon_base_type_map($1), `', `polaris_ripcon_service_server_full($1, $2, $3, $4, $5)')
ripcon_base_type_map_set($1, 1)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ripcon\_base\_ripcon\_te.m4

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```

#
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#
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#

## <summary>Polaris ngwc_plfm_mgr Policy Rules.</summary>

#####

## <summary>

```

```

## Read /tmp/installer files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ngwc_plfm_mgt_tmp_manage`,`
gen_require(`
type polaris_ngwc_plfm_mgr_tmp_t;
`)
manage_dirs_pattern($1, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
manage_files_pattern($1, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcplfmgr.if

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```

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#

```

```

## <summary>Polaris dmi_dmiauthd Policy Rules.</summary>

```

```

#####

```

```

## <summary>
## Connect to and send messages to dmiauthd.
## tmp/.DmiAuth.sock unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dmi_dmiauthd_dgram_send`,`
gen_require(`
type polaris_dmi_dmiauthd_tmp_t;
type polaris_dmi_dmiauthd_t;
`)
allow $1 self:unix_stream_socket {create_socket_perms};
allow $1 polaris_dmi_dmiauthd_t:unix_stream_socket { connectto };
write_sock_files_pattern($1, polaris_dmi_dmiauthd_tmp_t,polaris_dmi_dmiauthd_tmp_t)

```

```

')

#####
## <summary>
##   Manage dmiauthd fifo files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dmiauthd_tmp_manage`,`
    gen_require(`
        type polaris_dmi_dmiauthd_tmp_t;
        type tmp_t;
    `)
    manage_fifo_files_pattern($1, tmp_t, polaris_dmi_dmiauthd_tmp_t)
`)

#####
## <summary>
##   Write into fifo file created by dmiauthd, typical case when
##   dmiauthd starts script under popen.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dmiauthd_use_fifo`,`
    gen_require(`
        type polaris_dmi_dmiauthd_t;
    `)
    write_fifo_files_pattern($1, polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_t)
`)

#####
## <summary>
##   Manage /tmp/netconf-yang-diag/ files
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
## <rolebase/>

```

```
#
interface(`polaris_dmiauthd_tmp_diags_manage`,
  gen_require(`
    type polaris_dmi_dmiauthd_tmp_diags_t;
  `)
  manage_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
  manage_dirs_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
  manage_lnk_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
)
```

```
#####
```

```
## <summary>
## Read /tmp/netconf-yang-diag/ files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
```

```
interface(`polaris_dmiauthd_tmp_diags_read`,
  gen_require(`
    type polaris_dmi_dmiauthd_tmp_diags_t;
  `)
  read_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
  list_dirs_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
  read_lnk_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.if

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```
#
# March 2019, Shikhar Dogra
#
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#
```

```
# polarisfmancc file contexts place holder
```

Found in path(s):

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```
dnl
```

dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^lipc_stem', `translit(patsubst($1, `-lipc$', ``), `-', `_'`)
```

```
define(^lipc_label', `format(^polaris_%s_lipc_t', lipc_stem($1))')
```

dnl Lipc Type Map: track that type declations unique

```
define(^lipc_type_map', `defn(format(`lipc_type_map[%s]", `$1'))')
```

```
define(^lipc_type_map_set', `define(format(`lipc_type_map[%s]", `$1'), `$2'))')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_lipc.m4
```

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#

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#

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#

```
policy_module(polariscfgmgr, 1.0);
```

```
gen_require(^
```

```
    type polaris_cfgmgr_t;
```

```
)
```

```
polaris_chasfs_manage(polaris_cfgmgr_t)
```

```
# read day0_oper.xml and write local.data.tmp
```

```
polaris_bootflash_manage(polaris_cfgmgr_t)
```

```
polaris_boot_tmp_read(polaris_cfgmgr_t)
```

```
polaris_cpld_read(polaris_cfgmgr_t)
```

```
polaris_tdlresolve_read(polaris_cfgmgr_t)
```

```
polaris_flashlib_read(polaris_cfgmgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_cfgmgr_t)
```

```
polaris_db_tdlb_dir_use(polaris_cfgmgr_t)
```

```
logging_send_syslog_msg(polaris_cfgmgr_t)
```

```
# vconfd_load_shared_schemas
```

```
polaris_confd_shared_schema_read(polaris_cfgmgr_t)
```

```
polaris_cedge_reset_ns(polaris_cfgmgr_t)
```

```
polaris_cedge_etc_manage(polaris_cfgmgr_t)
```

```

# /etc/version is opened via "show sdwan version"
polaris_confd_etc_read(polaris_cfgmgr_t)

# /var/run/.cfgmgr socket and pid
type polaris_cfgmgr_var_run_t;
files_pid_file(polaris_cfgmgr_var_run_t)
manage_files_pattern(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, polaris_cfgmgr_var_run_t)
manage_sock_files_pattern(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, polaris_cfgmgr_var_run_t)
files_pid_filetrans(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, { file sock_file })

# sets up symbloc link /var/run/netns/default to pid 1 netns
sysnet_manage_ifconfig_run(polaris_cfgmgr_t)

# PLEASE LOOK AT ME create_syslog_conf_file function in
# viptela/cfgmgr/cfgmgr_logging.c creates /etc/syslog.conf.sysklogd file
# that nobody uses in polaris
files_manage_etc_files(polaris_cfgmgr_t)

# in cfgmgr_vpn_namespace_add creates udp socket
allow polaris_cfgmgr_t self:udp_socket create_socket_perms;

# watch /bootflash/sdwan/day0_oper.xml
polaris_persistent_watch(polaris_cfgmgr_t)

# compute_available_memory executes '/bin/df /dev/shm'
corecmd_exec_bin(polaris_cfgmgr_t)
# vip_binos_cpuinfo calls sysconf
dev_read_sysfs(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem collects SDWAN_DISK_MOUNT (/bootflash) fs info
fs_getattr_xattr_fs(polaris_cfgmgr_t)
# crashlist_refresh collects info about corefiles
polaris_core_file_read(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem collects info about /bootflash/.installer fs
polaris_disk_install_read(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem() collects available mem info by executing
# '/bin/df /tmp/tp/tdldb'
polaris_tdlb_list_dirs(polaris_cfgmgr_t)

#vip_binos_cpuinfo() performs file operations on PROC_CPUSTAT_FILE (/proc/stat)
polaris_disk_install_fs_getattr(polaris_cfgmgr_t)
#vip_binos_meminfo() reads PROC_MEMINFO_PATH (/proc/meminfo)
kernel_read_system_state(polaris_cfgmgr_t)

# configure ip address on system interface on vrf 1
sysnet_domtrans_ifconfig(polaris_cfgmgr_t)

# create tunnel interface in cfgmgr_tun_alloc function

```

```
corenet_rw_tun_tap_dev(polaris_cfgmgr_t)
allow polaris_cfgmgr_t self:tun_socket create;

# works if /proc accept_source_route file of system interface
kernel_rw_net_sysctls(polaris_cfgmgr_t)

# work with /tmp/xml/geostats
polaris_cedge_xml_tmp_manage(polaris_cfgmgr_t)

# work with /tmp/tmp/geostats
polaris_cedge_tmp_manage(polaris_cfgmgr_t)
allow polaris_cfgmgr_t self:process setpgid;

# map on /etc/passwd
auth_map_passwd(polaris_cfgmgr_t)

# give read permissions for /tmp/GPS_supported file created by iosd
polaris_iosd2iox_tmp_read(polaris_cfgmgr_t)
```

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dnl May 2018, Manohar Hungund

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dnl

dnl Starfleet Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`bp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 1)

max\_bay\_map\_set(`fp', `per\_bay', 1)

min\_bay\_ripc\_map\_set(`rp', `per\_bay', 0)

min\_bay\_ripc\_map\_set(`bp', `per\_bay', 0)

min\_bay\_ripc\_map\_set(`cc', `per\_bay', 1)

min\_bay\_ripc\_map\_set(`fp', `per\_bay', 0)

max\_bay\_ripc\_map\_set(`rp', `per\_bay', 1)

max\_bay\_ripc\_map\_set(`bp', `per\_bay', 1)

max\_bay\_ripc\_map\_set(`cc', `per\_bay', 1)

max\_bay\_ripc\_map\_set(`fp', `per\_bay', 1)

min\_bay\_ripc\_map\_set(`rp', `global', 0)

min\_bay\_ripc\_map\_set(`bp', `global', 0)

min\_bay\_ripc\_map\_set(`cc', `global', 1)

min\_bay\_ripc\_map\_set(`fp', `global', 0)

max\_bay\_ripc\_map\_set(`rp', `global', 1)

max\_bay\_ripc\_map\_set(`bp', `global', 1)

max\_bay\_ripc\_map\_set(`cc', `global', 1)

max\_bay\_ripc\_map\_set(`fp', `global', 1)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`fp', `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`fp', `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/bigbangmaps.m4

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dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`fp', `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`fp', `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/quake2maps.m4

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#

# August 2017, Shawn Lu

#

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#

# polarisodmproxy file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.fc

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#

## <summary>Polaris rif\_mgr Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.if

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#

#

# August 2018 Man-Yee Hau

#

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/usr/cpp/bin/qfp-ucode-csr -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-csr-us -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-csx -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-c8kv -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-wlc -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-utah -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-tsn -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-tsn-le -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-supernova -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-blackheart -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-sparrow -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-aventus -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-cabo -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-goldbeach -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

/usr/cpp/bin/qfp-ucode-radium -- gen\_context(system\_u:object\_r:polaris\_qfp\_exec\_t,s0)

```

/usr/cpp/bin/qfp-ucode-fugazi -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-sumatra -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-nanook -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-csr-fb -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/var/run/.rte_config -- gen_context(system_u:object_r:polaris_qfp_var_run_t,s0)

/dev/netmap -c gen_context(system_u:object_r:polaris_netmap_device_t,s0)

/dev/svc_eng_punt[0-9]* -c gen_context(system_u:object_r:polaris_sep_device_t,s0)

# qfp memif interfaces
/bootflash/SHARED-IOX/memif(/.*)? gen_context(system_u:object_r:polaris_qfp_memif_t,s0)
/tmp/memif(/.*)? gen_context(system_u:object_r:polaris_qfp_memif_t,s0)

# CSR & C8KV infiniband devices for Azure
/dev/infiniband/uverbs[0-9]* -c gen_context(system_u:object_r:polaris_infiniband_device_t,s0)

/etc/rc.d/init.d/iocb.sh -- gen_context(system_u:object_r:polaris_iocb_exec_t,s0)

# For Intel quickassist (qat) v1.5 - Note that mcp_family also includes this.
# fugazi uses polarismcp.fc and polasrisqfp.fc so need to exclude it here.
ifndef(`mcp_family',`
/dev/icp_adf_ctl -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s
)

# For platforms which use Intel quickassist (qat) v1.7
/dev/usdm_drv -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/qat_adf_ctl -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/qat_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

# For platforms which use the musdk from the Marvell 10.3.x.x SDK
/dev/musdk-cma -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisqfp.fc
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#

/usr/binos/conf/telnetd_service.sh -- gen_context(system_u:object_r:polaris_tservice_telnet_exec_t,s0)
/usr/binos/conf/sshd_service.sh -- gen_context(system_u:object_r:polaris_tservice_ssh_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristservice.fc

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#

/usr/binos/conf/rollback\_timer.sh -- gen\_context(system\_u:object\_r:polaris\_rbtimer\_exec\_t,s0)

/bootflash/.rollback\_timer(/.\*)? gen\_context(system\_u:object\_r:polaris\_rbtimer\_bootflash\_t,s0)

/tmp/rp/rollback\_timer(/.\*)? gen\_context(system\_u:object\_r:polaris\_rbtimer\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.fc

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dnl

dnl Katar WLC Platform Max Bay Limits

max\_bay\_map\_set(^rp', `per\_bay', 0)

max\_bay\_map\_set(^cc', `per\_bay', 3)

max\_bay\_map\_set(^fp', `per\_bay', 0)

max\_bay\_ripc\_map\_set(^rp', `per\_bay', 0)

max\_bay\_ripc\_map\_set(^cc', `per\_bay', 3)

max\_bay\_ripc\_map\_set(^fp', `per\_bay', 0)

max\_bay\_ripc\_map\_set(^rp', `global', 0)

max\_bay\_ripc\_map\_set(^cc', `global', 3)

max\_bay\_ripc\_map\_set(^fp', `global', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(^rp', `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(^cc', `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(^fp', `elasitc', BPROC\_ODM, 1)

max\_elastic\_map\_set(^rp', `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(^cc', `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(^fp', `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(^rp', `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(^cc', `elastic', BPROC\_ODM, 1)

```
max_elastic_ripc_map_set(`fp', `elasitc', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(`rp', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`cc', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`fp', `elastic', BPROC_WNCD, 7)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/katarmaps.m4
```

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```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

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```

```
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```

```
#
```

```
# polariscontainer file contexts place holder
```

```
# All the possible IOX flash_dir/harddisk_dir from iox_polaris.conf for docker
```

```
# Expected labels for docker as per container.fc
```

```
/bootflash/docker(/.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
```

```
/bootflash/docker/./config\env gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
```

```
/bootflash/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker(/.*)?
```

```
gen_context(system_u:object_r:container_var_lib_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./config\env
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./.*\log
```

```
gen_context(system_u:object_r:container_log_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./hostname
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./hosts
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./init(/.*)?
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./overlay(/.*)?
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker/./overlay2(/.*)?
```

```
gen_context(system_u:object_r:container_share_t,s0)
```

```
/mnt/sd3/docker(/.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
```

```

/mnt/sd3/docker/./config\env          gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./containers/./.*\log  gen_context(system_u:object_r:container_log_t,s0)
/mnt/sd3/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./containers/./hosts   gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./overlay(/.*)?       gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./overlay2(/.*)?      gen_context(system_u:object_r:container_share_t,s0)

```

```

ifdef(`nyquist_platform',`
/mnt/sd3/iox_alt_hdd_mount_dir/docker(/.*)?
gen_context(system_u:object_r:container_var_lib_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./config\env
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./.*\log
gen_context(system_u:object_r:container_log_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./hostname
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./hosts
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./init(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./overlay(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./overlay2(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
')

```

```

ifdef(`passport_platform',`
/flash1/iox_alt_hdd_mount_dir/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./config\env
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./containers/./.*\log
gen_context(system_u:object_r:container_log_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./containers/./hostname
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./containers/./hosts
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./overlay(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/./overlay2(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
')

```

```

/flash1/iox/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/flash1/iox/docker/./config\env    gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/./containers/./.*\log  gen_context(system_u:object_r:container_log_t,s0)
/flash1/iox/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)

```

```

/flash1/iox/docker./*/containers./*/hosts    gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker./*/init(/.*)?            gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker./*/overlay(/.*)?         gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker./*/overlay2(/.*)?        gen_context(system_u:object_r:container_share_t,s0)

/flash11/iox/docker(/.*)?                   gen_context(system_u:object_r:container_var_lib_t,s0)
/flash11/iox/docker./*/config\,env          gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker./*/containers./*/.*\,log gen_context(system_u:object_r:container_log_t,s0)
/flash11/iox/docker./*/containers./*/hostname gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker./*/containers./*/hosts   gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker./*/init(/.*)?           gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker./*/overlay(/.*)?        gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker./*/overlay2(/.*)?       gen_context(system_u:object_r:container_share_t,s0)

/vol/harddisk/docker(/.*)?                  gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/harddisk/docker./*/config\,env         gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker./*/containers./*/.*\,log gen_context(system_u:object_r:container_log_t,s0)
/vol/harddisk/docker./*/containers./*/hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker./*/containers./*/hosts   gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker./*/init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker./*/overlay(/.*)?       gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker./*/overlay2(/.*)?      gen_context(system_u:object_r:container_share_t,s0)

/vol/disk0/docker(/.*)?                    gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/disk0/docker./*/config\,env           gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker./*/containers./*/.*\,log  gen_context(system_u:object_r:container_log_t,s0)
/vol/disk0/docker./*/containers./*/hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker./*/containers./*/hosts     gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker./*/init(/.*)?            gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker./*/overlay(/.*)?         gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker./*/overlay2(/.*)?        gen_context(system_u:object_r:container_share_t,s0)

/vol/usb1/docker(/.*)?                     gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/usb1/docker./*/config\,env            gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker./*/containers./*/.*\,log   gen_context(system_u:object_r:container_log_t,s0)
/vol/usb1/docker./*/containers./*/hostname  gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker./*/containers./*/hosts     gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker./*/init(/.*)?             gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker./*/overlay(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker./*/overlay2(/.*)?         gen_context(system_u:object_r:container_share_t,s0)

#Sumatra
/vol/usb1/iox/docker(/.*)?                 gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/usb1/iox/docker./*/config\,env        gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker./*/containers./*/.*\,log gen_context(system_u:object_r:container_log_t,s0)
/vol/usb1/iox/docker./*/containers./*/hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker./*/containers./*/hosts   gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker./*/init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)

```

```
/vol/usb1/iox/docker/*/*overlay(/.*)?      gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/*/*overlay2(/.*)?     gen_context(system_u:object_r:container_share_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscontainer.fc
```

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```
#
# March 2017, Victor Kamensky
#
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#

policy_module(polarissortfiles, 1.0);

gen_require(`
    type polaris_sort_files_t;
`)

corecmd_exec_bin(polaris_sort_files_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_sort_files_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_sort_files_t)

polaris_btrace_data_manage(polaris_sort_files_t)
polaris_chasfs_manage(polaris_sort_files_t)
polaris_rmonbifo_tmp_read(polaris_sort_files_t)
polaris_read_debug_conf(polaris_sort_files_t)
polaris_persistent_getattr(polaris_sort_files_t)
polaris_persistent_list_dirs(polaris_sort_files_t)
polaris_cpld_read(polaris_sort_files_t)
polaris_capsule_upgrade_log_use(polaris_sort_files_t)
optional_policy(`
polaris_gnmib_gnoi_images_read(polaris_sort_files_t)
`)

# Dontaudit /bootflash/#lost+found avc denials
dontaudit polaris_sort_files_t polaris_disk:chr_file { getattr };
dontaudit polaris_sort_files_t polaris_disk:blk_file { getattr };

#allow polaris_sort_files_t polaris_udev_tmp_files_t:dir { getattr search };
polaris_udev_tmp_list_dirs(polaris_sort_files_t)

optional_policy(`
```

```

polaris_iox_dir_list(polaris_sort_files_t)
')

polaris_sandbox_file_dir_list(polaris_sort_files_t)

polaris_disk_bootflash_read_lnk(polaris_sort_files_t)

polaris_disk_bootflash_fifo_file_getattr(polaris_sort_files_t)
polaris_disk_bootflash_sock_file_getattr(polaris_sort_files_t)

# allow search and read under /tmp/boot directory
polaris_boot_tmp_read(polaris_sort_files_t)

#allow manage the files under /tmp/sort
type polaris_sort_files_tmp_t;
files_tmp_file(polaris_sort_files_tmp_t)
files_tmp_filetrans(polaris_sort_files_t, polaris_sort_files_tmp_t, file)
manage_files_pattern(polaris_sort_files_t, polaris_sort_files_tmp_t, polaris_sort_files_tmp_t)

# for pluggable FS, allow sort to access files on them.
polaris_getattr_removable(polaris_sort_files_t)
polaris_removable_manage(polaris_sort_files_t)
fs_read_removable_symlinks(polaris_sort_files_t)

# to look at files sort_file sometime needs to violate DAC permissions
allow polaris_sort_files_t self:capability dac_read_search;

optional_policy(`
# LOOK AT ME memif sock_file interface present in /bootflash as
# /bootflash/SHARED-IOX/memif/memif-dp-svr, since class of the
# object is sock_file adding it to polaris_disk does not make much
# sense
gen_require(`
    type polaris_qfp_memif_t;
`)
getattr_sock_files_pattern(polaris_sort_files_t, polaris_qfp_memif_t, polaris_qfp_memif_t)
`)

# find runs fstatfs
fs_getattr_xattr_fs(polaris_sort_files_t)

# allow polaris_sort_files_t fs_t:filesystem getattr
fs_getattr_all_fs(polaris_sort_files_t)

# with "/bootflash"...this needs attr to access for logfile
polaris_user_file_getattr(polaris_sort_files_t)

optional_policy(`

```

```
gen_require(  
    type polaris_efi_files_t;  
)  
#find /bootflash/ -printf %i %p  
allow polaris_sort_files_t polaris_efi_files_t:dir { getattr open read search };  
  
#stat -c %i %f %s %n /bootflash/EFI/UpdateCapsule/UpdateCapsuleFile.bin  
allow polaris_sort_files_t polaris_efi_files_t:file getattr;  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissortfiles.te  
No license file was found, but licenses were detected in source scan.
```

```
#  
# June 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polarisioxman, 1.0);
```

```
gen_require(  
    type polaris_ioxman_t;  
)
```

```
polaris_btrace_data_manage(polaris_ioxman_t)  
polaris_chasfs_manage(polaris_ioxman_t)  
polaris_tdlresolve_read(polaris_ioxman_t)  
polaris_tdlldb_list_dirs(polaris_ioxman_t)  
polaris_cpld_read(polaris_ioxman_t)  
polaris_lua_read(polaris_ioxman_t)  
polaris_flashlib_read(polaris_ioxman_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_ioxman_t)
```

```
polaris_db_tdlldb_dir_use(polaris_ioxman_t)
```

```
#allow access to /bootflash/iox/ files  
polaris_iox_dir_search(polaris_ioxman_t)
```

```
corenet_tcp_connect_polaris_caf_api_port(polaris_ioxman_t)
```

```
# allow read permissions for /etc/hosts file  
sysnet_read_config(polaris_ioxman_t)
```

```
# ioxman interacting with caf through api http interface and
```

```

# is uses curl library to send requests to caf. curl wants
# to do getsockopt with SOL_SOCKET,
allow polaris_ioxman_t self:tcp_socket getopt;

# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_ioxman_t)

corecmd_exec_bin(polaris_ioxman_t)
corecmd_exec_shell(polaris_ioxman_t)

# allow to run mount in its own domain; guestshell_set_netns.sh
# needs it; also, read and exec the set_netns script.
# ioxman_setup_guestshell_namespace invokes the script
# using NAMESPACE_COMMAND
mount_domtrans(polaris_ioxman_t)
polaris_guestshell_files_read(polaris_ioxman_t)
polaris_guestshell_exec_files_exec(polaris_ioxman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_ioxman_t)

# guestshell_set_netns.sh calls ps command
# ps needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_ioxman_t)
# ps needs access to proc_t
kernel_read_system_state(polaris_ioxman_t)

# modifies /bootflash/iox/iox_app/guestshell_iox.json
polaris_iox_files_manage(polaris_ioxman_t)

# guestshell_set_netns.sh touches /var/run/netns/guestshell
files_pid_filetrans(polaris_ioxman_t, polaris_guestshell_var_run_t, file, "guestshell")
polaris_guestshell_var_run_files_manage(polaris_ioxman_t)

# Read and write the all pty
term_use_generic_ptys(polaris_ioxman_t)

# allow ioxman_syslib.sh to set uid/gid for screen
allow polaris_ioxman_t self:capability { dac_override setgid setuid };

# ioxman execve virsh
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_ioxman_t, virsh_exec_t, virsh_t)
# virsh needs to write into /tmp/rp/trace/iox_guestshell.log
polaris_btrace_data_manage(virsh_t)

```

```

# ioxman is vman client over @vman_domain_socket socket
optional_policy(
    polaris_vman_use_client_socket(polaris_ioxman_t)
)

# ioxman uses VS_OPER_DB from virtual_services_tbl_init
polaris_tdlbpbersist_setup(polaris_ioxman_t)

polaris_tmp_tdlb_persist_setup(polaris_ioxman_t)

# ioxman through libcurl library hit c-ares DNS code needs
# udp sockets access
allow polaris_ioxman_t self:udp_socket connect;

logging_send_syslog_msg(polaris_ioxman_t)

# read /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_ioxman_t)

virt_manage_sandbox_files(polaris_ioxman_t)

# handle ioxman /tmp files like /tmp/iox_xml.dat
type polaris_iox_tmp_t;
files_tmp_file(polaris_iox_tmp_t)
polaris_iox_manage_tmp_files(polaris_ioxman_t)

# by some strange reason ioxman munges files in /bootflash/tracelogs
# please see iox_tracefile_restore in ioxman/src/im_serial.c
polaris_btrace_persistent_data_manage(polaris_ioxman_t)

# virsh execved from ioxman inherits stdout from ioxman
gen_require(
    type polaris_ioxman_bt_t;
    type virsh_t;
)
allow virsh_t polaris_ioxman_bt_t:file write;

optional_policy(
gen_require(
    attribute polaris_domain;
    attribute polaris_extended_domain;
    type container_runtime_t;
)
typeattribute container_runtime_t polaris_domain;
typeattribute container_runtime_t polaris_extended_domain;
)

```

```

# /usr/bin/conf/shell_exec.sh policy

polaris_utility_domain_template(iox_shell)

polaris_bexecute_domain(polaris_iox_shell_t, polaris_iox_shell_exec_t)
# shell_exec call bexec.sh
polaris_bexecute_domtrans(polaris_iox_shell_t)
corecmd_exec_bin(polaris_iox_shell_t)
polaris_chasfs_read(polaris_iox_shell_t)
auth_use_nsswitch(polaris_iox_shell_t)
fs_getattr_tmpfs(polaris_iox_shell_t)

mount_domtrans(polaris_iox_shell_t)

# inherit stdin from telnetd
telnet_use_ptys(polaris_iox_shell_t)

# create files under /bootflash/iox
polaris_iox_files_manage(polaris_iox_shell_t)

# executing guestshell.sh
polaris_guestshell_exec_files_exec(polaris_iox_shell_t)
polaris_guestshell_files_read(polaris_iox_shell_t)

# executing "ip netns exec guestshell /usr/bin/ssh ..."
sysnet_exec_ifconfig(polaris_iox_shell_t)
fs_read_nsfs_files(polaris_iox_shell_t)
files_mouton_rootfs(polaris_iox_shell_t)
dev_mouton_sysfs(polaris_iox_shell_t)
allow polaris_iox_shell_t self:netlink_route_socket rw_netlink_socket_perms;
dev_mount_sysfs_fs(polaris_iox_shell_t)
dev_unmount_sysfs_fs(polaris_iox_shell_t)

# executing ssh
corenet_tcp_connect_ssh_port(polaris_iox_shell_t)
ssh_exec(polaris_iox_shell_t)
allow polaris_iox_shell_t self:tcp_socket { connect create getattr getopt setopt shutdown };

# ssh creates /root/.ssh directory
userdom_create_user_home_dirs(polaris_iox_shell_t)

# read /etc/guestshell_rsa_key
polaris_guestshell_key_read(polaris_iox_shell_t)

# work with sandbox files
polaris_sandbox_file_dir_list(polaris_iox_shell_t)

polaris_caf_var_run_files_manage(polaris_iox_shell_t)

```

```

# shell_exec.sh invokes:
# mkdir /tmp/.shell_exec
# create /tmp/.shell_exec/*
type polaris_iox2iosd_tmp_t;
files_tmp_file(polaris_iox2iosd_tmp_t)
files_tmp_filetrans(polaris_iox_shell_t, polaris_iox2iosd_tmp_t, dir, ".shell_exec")
files_tmp_filetrans(polaris_iox_shell_t, polaris_iox2iosd_tmp_t, file)
#allow shell_exec to manage /tmp/.ncsshd_authorized_keys
polaris_ncsshd_keys_manage(polaris_iox_shell_t)
# allow shell_exec to manage /tmp/.shell_exec/* files
polaris_iox2iosd_tmp_manage(polaris_iox_shell_t)
# allow shell_exec to work with files created by iosd
polaris_iosd2iox_tmp_manage(polaris_iox_shell_t)
ifdef(`nyquist_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_iox_shell_t)
')
ifdef(`passport_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_iox_shell_t)
')

allow polaris_iox_shell_t self:capability { chown dac_override fowner fsetid setgid setuid dac_read_search };
allow polaris_iox_shell_t self:cap_userns sys_admin;
allow polaris_iox_shell_t self:process setfscreate;

# LOOK AT ME very fishy iox_shell executes
# /bootflash/iox/repo-lxc/guestshell/rootfs_mnt/cisco/shell_exec.sh that
# actually can be modified from container itself. File is recreated
# each guestshell activation and it seems not executed afterwards.
# Grant access for now. Need to look closely whether it could be exploited
# in some way
virt_exec_sandbox_files(polaris_iox_shell_t)

# ip command called from iox_shell, running it under
# iox_shell domain, add required mounton on unlabeled_t
files_mounton_isid(polaris_iox_shell_t)

# read guestshell net namespace file
fs_read_nsfs_files(polaris_ioxman_t)

# need to create /bootflash/gs_script/db.ini file
polaris_bootflash_manage(polaris_ioxman_t)
polaris_harddisk_manage(polaris_ioxman_t)

# run_ioxn_secure_dir.sh policy
gen_require(`

```

```

    type polaris_iox_secure_dir_t;
)
corecmd_exec_bin(polaris_iox_secure_dir_t)
auth_use_nsswitch(polaris_iox_secure_dir_t)
polaris_caf_files_read(polaris_iox_secure_dir_t)
polaris_chasfs_manage(polaris_iox_secure_dir_t)
polaris_bootflash_manage(polaris_iox_secure_dir_t)
polaris_harddisk_manage(polaris_iox_secure_dir_t)
polaris_iox_files_manage(polaris_iox_secure_dir_t)

# /bin/cat9k_ssd_auth_cmds.sh

polaris_utility_domain_template(ssd_auth)

corecmd_exec_bin(polaris_ssd_auth_t)
storage_getattr_fixed_disk_dev(polaris_ssd_auth_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_ssd_auth_t)

fs_getattr_tmpfs(polaris_ssd_auth_t)

# execute hdparam in its own domain
fstools_domtrans(polaris_ssd_auth_t)

polaris_use_btrace_fifo(polaris_ssd_auth_t)

type polaris_ssd_auth_tmp_t;
files_tmp_file(polaris_ssd_auth_tmp_t)
# bash tmp files like /tmp/sh-thd.kxX3sc
files_tmp_filetrans(polaris_ssd_auth_t, polaris_ssd_auth_tmp_t, file)
manage_files_pattern(polaris_ssd_auth_t, polaris_ssd_auth_tmp_t, polaris_ssd_auth_tmp_t)
# /tmp/ssd_blk_device created by udev
gen_require(`
    type udev_t;
    type tmpfs_t;
    type tmp_t;
)
filetrans_pattern(udev_t, {tmpfs_t tmp_t}, polaris_ssd_auth_tmp_t, file, "ssd_blk_device")
polaris_getattr_harddisk(polaris_ssd_auth_t)

fs_read_cgroup_files(polaris_ioxman_t)

# Allow ioxman to download package files using url
polaris_caf_tmp_files_manage(polaris_ioxman_t)
polaris_cli_fs_cmds_domtrans(polaris_ioxman_t)
# ufs information captured by the chasfs utils
optional_policy(`

```

```

polaris_ncd_tmp_read(polaris_ioxman_t)
')
gen_require(
    type polaris_fts_client_tmp_t;
)

manage_files_pattern(polaris_ioxman_t, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
manage_dirs_pattern(polaris_ioxman_t, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
allow polaris_ioxman_t tmp_t:file { create open unlink write };

# get_orchestration_template in cgroup_init_common.sh reads
# ovf-env.xml file from removable and varied
fs_read_removable_files(polaris_ioxman_t)
polaris_disk_varied_read(polaris_ioxman_t)

# writes into /tmp/trace/resource.log
optional_policy(
    polaris_vman_tmp_manage(polaris_ioxman_t)
)

# watch over /tmp/udev/etc/udev/usbflash1 in iox_media_chasfs_watch
polaris_udev_tmp_read(polaris_ioxman_t)
polaris_udev_tmp_watch(polaris_ioxman_t)

ifdef(^nyquist_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_ioxman_t)
`)

dev_getattr_fs(polaris_iox_shell_t)
kernel_read_system_state(polaris_iox_shell_t)

gen_require(
    type virt_lxc_var_run_t;
)
read_files_pattern(polaris_ioxman_t, virt_lxc_var_run_t, virt_lxc_var_run_t)

#sys_resource denial is seen even on factory reset
allow polaris_ioxman_t self:capability sys_resource;

ifdef(^passport_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_ioxman_t)
`)

polaris_iosd_vcpu_read(polaris_ioxman_t)

# work with files like /tmp/guestinfo_status.txt

```

```

polaris_iosd2iox_tmp_manage(polaris_ioxman_t)

gen_require(
    type screen_var_run_t;
    type screen_exec_t;
)

# allow ioxman to set up ttys for screen
polaris_caf_tty_lnk_manage(polaris_ioxman_t)

# allow ioxman_syslib.sh to invoke screen
screen_exec(polaris_ioxman_t)

# add entrypoint to screen_exec/can_exec permissions
allow polaris_ioxman_t screen_exec_t:file entrypoint;

# make sure /tmp/screens is labeled correctly
files_tmp_filetrans(polaris_ioxman_t, screen_var_run_t, dir, "screens")

# allow ioxman to manage /tmp/screens/<appname>_con/aux.sid
manage_files_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)

# allow ioxman to manage sock_files and unix_stream_socket on screen
allow polaris_ioxman_t self:unix_stream_socket { create_socket_perms connectto };
manage_dirs_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)
manage_sock_files_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)

# allow ioxman to transition into bexecute domain
polaris_bexecute_domtrans(polaris_ioxman_t)
polaris_bexecute_domain(polaris_ioxman_t, screen_exec_t)
# allow bexecute to access the /tmp/screens/*.sid files
gen_require(
    type polaris_bexecute_t;
)
manage_files_pattern(polaris_bexecute_t, screen_var_run_t, screen_var_run_t)

# allow shell_exec to manage /tmp/.ncsshd_authorized_keys
polaris_ncsshd_keys_manage(polaris_iox_shell_t)
polaris_iox2iosd_tmp_manage(polaris_iox_shell_t)

# allow shell_exec to manage guestshell files
gen_require(
    type container_file_t;
)
manage_files_pattern(polaris_iox_shell_t, container_file_t, container_file_t)

# allow ioxman to setattr for /dev/pts relating to screen
gen_require(

```

```

type telnetd_devpts_t;
)
allow polaris_ioxman_t telnetd_devpts_t:chr_file setattr_chr_file_perms;

# allow ioxman to access the /tmp/ttyF*. files
gen_require(
    type fifo_var_run_t;
)
files_tmp_filetrans(polaris_ioxman_t, fifo_var_run_t, fifo_file)
manage_fifo_files_pattern(polaris_ioxman_t, fifo_var_run_t, fifo_var_run_t)

# allow ioxman to access rootfs and sysfs
# The same is needed when guestshell uses a passwordless SSH, when users do
# like "guestshell run bash" from IOS and it provides a bash shell screen
# in IOS.

gen_require(
    type ssh_home_t;
)

ssh_filetrans_admin_home_content(polaris_iox_shell_t)
allow polaris_iox_shell_t ssh_home_t:dir {create search getattr};
dev_getattr_sysfs_fs(polaris_iox_shell_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisioxman.te

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

```

```

policy_module(polarismqipc, 1.0);

```

```

attribute polaris_mqipc;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismqipc.te

No license file was found, but licenses were detected in source scan.

```

#
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```

```

#

/var/run/cli_agent\.pid -- gen_context(system_u:object_r:polaris_cli_agent_var_run_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscliagent.fc
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisvxe, 1.0);

# hanet driver used by vpcgw platform of VXE family
ifdef(`vpcgw_platform',`
type polaris_hanet_device_t;
dev_node(polaris_hanet_device_t)
')

# on ultra in some cloud configuration runs dhclient utility
# receive meta information from cloud provider, /var/lib/dhcp
# directory is created by initrc_t
gen_require(`
    type dhcp_t;
    type initrc_t;
    type dhcp_state_t;
')
files_var_lib_filetrans({ dhcp_t initrc_t }, dhcp_state_t, dir, "dhcp")

# during boot on misc cloud environment ultra image creates directory
# in /tmp to keep information received from cloud provider. Since latter
# it is copied into /varied directory let's assigned polaris_disk_varied_t
# to them
gen_require(`
    type initrc_t;
    type polaris_disk_varied_t;
    type unconfined_service_t;
')
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "ami")
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "azure")
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "gcp")

# park policy for small polaris process umbrella_init.sh here
gen_require(`

```

```

    type polaris_umbrella_init_t;
)
polaris_bootflash_manage(polaris_umbrella_init_t)
corecmd_exec_bin(polaris_umbrella_init_t)
auth_use_nsswitch(polaris_umbrella_init_t)

# define added to address issues related to dependency
# on mcp-platform-tdl for db defines
# Skip for vpcgw platform
ifndef(`vpcgw_platform`;
type polaris_gnmib_t;
)

type polaris_objstore_sem_t;
files_tmpfs_file(polaris_objstore_sem_t)

# semaphore created by systemd-tmpfiles needs map permission
gen_require(
    type systemd_tmpfiles_t;
)
mmap_files_pattern(systemd_tmpfiles_t, polaris_objstore_sem_t, polaris_objstore_sem_t)

# on vxe all processes read grub_cisco_version in polaris_disk_varied_t
gen_require(
    attribute polaris_domain;
)
polaris_disk_varied_search(polaris_domain)

type polaris_grub_bios_t;
polaris_pfile_type(polaris_grub_bios_t)

type polaris_grubver_t;
polaris_pfile_type(polaris_grubver_t)

type polaris_vxeinstall_info_t;
polaris_pfile_type(polaris_vxeinstall_info_t)
gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
)
# unconfined service create /boot/.install_info if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_vxeinstall_info_t, file, ".install_info")

# on C8KV all processes read grubenv in EFI disk partition
gen_require(
    attribute polaris_domain;
)
polaris_grub_efi_search(polaris_domain)

```

```

gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
    type polaris_obfl_data_t;
)
# unconfined service create /boot/obfl_temp_k1/2/3 if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k1")
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k2")
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k3")

# handle /tmp/vxe_disk_XXX_YYY files
gen_require(
    type unconfined_service_t;
)
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v3")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v4")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v3")
polaris_boot_tmp_manage(unconfined_service_t)

# /etc/init.d/sshd that runs under initrc_t through ssh-keygen
# creates /config/.ssh directory if does not exist; /config
# directory is typically bootflash, but on MBRv2/MBRv4/GPTv1/GPTv3
# partition layouts it could be separate /config partition that is
# under polaris_disk_config_t label
gen_require(
    type initrc_t;
    type ssh_home_t;
)
polaris_disk_config_filetrans(initrc_t, ssh_home_t, dir, ".ssh")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvxe.te

No license file was found, but licenses were detected in source scan.

```

#
# July 2017, Victor Kamensky
#
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#

```

```

policy_module(polarisissumonitor, 1.0);

```

```

#####
# install_issu_monitor
#####

polaris_process_domain_template(issu_monitor)

corecmd_exec_bin(polaris_issu_monitor_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_issu_monitor_t)

polaris_btrace_data_manage(polaris_issu_monitor_t)
polaris_chasfs_manage(polaris_issu_monitor_t)
polaris_cpld_read(polaris_issu_monitor_t)
polaris_proc_rmonbifo_read(polaris_issu_monitor_t)
polaris_boot_tmp_read(polaris_issu_monitor_t)
polaris_read_debug_conf(polaris_issu_monitor_t)

# read and possibly create /bootflash/.installer/issu_crash dir
polaris_bootflash_manage(polaris_issu_monitor_t)

allow polaris_issu_monitor_t self:capability sys_resource;
allow polaris_issu_monitor_t self:process setpgid;

type polaris_issu_monitor_tmp_t;
files_tmp_file(polaris_issu_monitor_tmp_t)
files_tmp_filetrans(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, dir, "issu_mon_dir")
manage_files_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)
manage_dirs_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)
manage_fifo_files_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)

#access to /tmp/ufs/harddisk
optional_policy(`
polaris_ncd_tmp_read(polaris_issu_monitor_t)
`)

# access to /bootflash/.installer/issu_crash
polaris_disk_install_read(polaris_issu_monitor_t)

# access to /tmp/sw/boot/rmonbifo/env_var.sh
polaris_rmonbifo_tmp_read(polaris_issu_monitor_t)

# read /proc/cmdline
kernel_read_system_state(polaris_issu_monitor_t)

# rm -rf /tmp/rp/issu_mon_dir
fs_getattr_tmpfs(polaris_issu_monitor_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.te

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```
#  
# February 2018, Manohar Hungund  
#  
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#
```

```
policy_module(polarisact2, 1.0);
```

```
#####  
# ACT2 Chip Driver policy  
#####
```

```
type polaris_act2_device_t;  
dev_node(polaris_act2_device_t)
```

```
#####  
# /tmp/hw_entropy file.  
# Certain platforms save entropy from main board ACT-2 chip in this file.
```

```
type polaris_hw_entropy_t;  
files_tmp_file(polaris_hw_entropy_t)
```

```
#####
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisact2.te

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```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polariscppha, 1.0);
```

```
gen_require(  
    type polaris_cpp_ha_t;  
)
```

```
polaris_btrace_data_manage(polaris_cpp_ha_t)  
polaris_crft_data_manage(polaris_cpp_ha_t)  
polaris_chasfs_manage(polaris_cpp_ha_t)
```

```

polaris_tdlresolve_read(polaris_cpp_ha_t)
polaris_tdlldb_list_dirs(polaris_cpp_ha_t)
polaris_cpld_read(polaris_cpp_ha_t)
polaris_flashlib_read(polaris_cpp_ha_t)

polaris_ripc_sman_ui_serv_connect(polaris_cpp_ha_t)

polaris_db_tdlldb_dir_use(polaris_cpp_ha_t)

polaris_cpp_process(polaris_cpp_ha_t)
polaris_cpp_dev_use(polaris_cpp_ha_t)

polaris_icc_broken_relocations(polaris_cpp_ha_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_ha_t)

# allow objstore access
polaris_disk_objstore_read(polaris_cpp_ha_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_ha_t)
')

# allow syslogging
logging_send_syslog_msg(polaris_cpp_ha_t)

optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_ha_t)
')
polaris_cpld_dev_use(polaris_cpp_ha_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppha.te
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#
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#
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#

policy_module(polariscppsp, 1.0);

gen_require(`
    type polaris_cpp_sp_t;

```

)

```
polaris_btrace_data_manage(polaris_cpp_sp_t)
polaris_crft_data_manage(polaris_cpp_sp_t)
polaris_chasfs_manage(polaris_cpp_sp_t)
polaris_tdlresolve_read(polaris_cpp_sp_t)
polaris_tdlldb_list_dirs(polaris_cpp_sp_t)
polaris_cpld_read(polaris_cpp_sp_t)
polaris_flashlib_read(polaris_cpp_sp_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_cpp_sp_t)
```

```
polaris_db_tdlldb_dir_use(polaris_cpp_sp_t)
```

```
polaris_cpp_process(polaris_cpp_sp_t)
polaris_cpp_dev_use(polaris_cpp_sp_t)
```

```
polaris_icc_broken_relocations(polaris_cpp_sp_t)
```

```
polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_sp_t)
```

```
# LOOK AT ME: raw memory access in cavium vendor SDK
```

```
# related to octeon driver (BUG CSCvh58515)
```

```
ifdef(`crankshaft_family',`
```

```
polaris_dev_mem_use(polaris_cpp_sp_t)
```

```
')
```

```
# allow syslogging
```

```
logging_send_syslog_msg(polaris_cpp_sp_t)
```

```
optional_policy(`
```

```
polaris_cbdma_dev_use(polaris_cpp_sp_t)
```

```
')
```

```
polaris_cpld_dev_use(polaris_cpp_sp_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppsp.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
/usr/binos/conf/reflector.sh -- gen_context(system_u:object_r:polaris_reflector_exec_t,s0)
```

```
/tmp/rp/reflector(/.*)?      gen_context(system_u:object_r:polaris_reflector_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisreflector.fc
```

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarissifmgr, 1.0);
```

```
gen_require(`
```

```
    type polaris_sif_mgr_t;
```

```
`)
```

```
polaris_btrace_data_manage(polaris_sif_mgr_t)
```

```
polaris_crft_data_manage(polaris_sif_mgr_t)
```

```
polaris_chasfs_manage(polaris_sif_mgr_t)
```

```
polaris_tdlresolve_read(polaris_sif_mgr_t)
```

```
polaris_tdlldb_list_dirs(polaris_sif_mgr_t)
```

```
polaris_cpld_read(polaris_sif_mgr_t)
```

```
polaris_lua_read(polaris_sif_mgr_t)
```

```
polaris_flashlib_read(polaris_sif_mgr_t)
```

```
#If romvar is not set, Set Rommon env variable needs write permission
```

```
polaris_flashlib_write(polaris_sif_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_sif_mgr_t)
```

```
corecmd_exec_bin(polaris_sif_mgr_t)
```

```
corecmd_exec_shell(polaris_sif_mgr_t)
```

```
# allow read of /etc/group and /etc/passwd
```

```
auth_use_nsswitch(polaris_sif_mgr_t)
```

```
# allow to read /proc/mtd
```

```
kernel_read_system_state(polaris_sif_mgr_t)
```

```
#allow write /proc/dplr_sesa
```

```
optional_policy(`
```

```
    polaris_proc_sesa_create_write(polaris_sif_mgr_t)
```

```
`)
```

```

# access SERDES /tmp/serdes_asic_key_dir/*
polaris_serdes_asic_key_tmp_manage(polaris_sif_mgr_t)

# allow read/write to /proc/irq/N/irq files
kernel_rw_irq_sysctls(polaris_sif_mgr_t)

# work with /tmp files (/tmp/sm_post_result)
type polaris_sif_mgr_tmp_t;
files_tmp_file(polaris_sif_mgr_tmp_t)
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sm_post_result")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "fips_status")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sif_regdump_0")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sif_regdump_1")
manage_files_pattern(polaris_sif_mgr_t, tmp_t, polaris_sif_mgr_tmp_t)
polaris_cm_rp_tmp_manage(polaris_sif_mgr_t)

#allow ipc_lock when mmap64(..) a shared mememoy with MAP_LOCKED in dplr_pkt_drv_oob.c
allow polaris_sif_mgr_t self:capability { ipc_owner dac_override ipc_lock };

#allow read from /tmp/hw_entropy
polaris_hw_entropy_read(polaris_sif_mgr_t)

polaris_obfl_data_manage(polaris_sif_mgr_t)

# /dev/dplr_intrpt usage
polaris_dplr_dev_use(polaris_sif_mgr_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_sif_mgr_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_sif_mgr_t)

polaris_lsmpi_dev_use(polaris_sif_mgr_t)

# open /dev/ttyS0 console in sco_sys_init_sw_params
term_use_unallocated_ttys(polaris_sif_mgr_t)

polaris_socketat_nsfs_read(polaris_sif_mgr_t)

allow polaris_sif_mgr_t self:process setsched;

# work with /dev/msi/Slot0/Doppler0/GroupN files
dev_rw_generic_chr_files(polaris_sif_mgr_t)
# /dev/msi/Slot0/Doppler0/GroupN gets polaris_dplr_device_t label
# at some point, but need above generic chr permission by some
# reason, not clear need to look a bit more
polaris_dplr_dev_use(polaris_sif_mgr_t)

```

```

# set out of band interface mac set_oobndif_mac
allow polaris_sif_mgr_t self:tcp_socket ioctl;

# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_sif_mgr_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_sif_mgr_t)
`)

# LOOK AT ME: unsolicited creation of file in /bootflash
# by CSCvm43512. Backout when CSCvm99282 is fixed
polaris_bootflash_manage(polaris_sif_mgr_t)
polaris_disk_bootflash_read_lnk(polaris_sif_mgr_t)

optional_policy(`
    polaris_quake_i2c_manage(polaris_sif_mgr_t)
`)

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`quake_platform',`
dev_read_sysfs(polaris_sif_mgr_t)
`)

optional_policy(`
polaris_ngwc_scc_shm_manage(polaris_sif_mgr_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissifmgr.te
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#
# August 2017, Shawn Lu
#
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#

# polariswncmgrd file contexts place holder

#gRPC certificate for ICap, written and read by wncmgrd
/bootflash/NACert.pem      gen_context(system_u:object_r:polaris_icap_cert_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncmgrd.fc

```

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```
dnl
dnl July 2020, Victor Kamensky
dnl
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dnl
dnl ISRV Platform Max Bay Limits
max_bay_map_set(rp, `per_bay', 0)
max_bay_map_set(cc, `per_bay', 3)
max_bay_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `per_bay', 0)
max_bay_ripc_map_set(cc, `per_bay', 3)
max_bay_ripc_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `global', 0)
max_bay_ripc_map_set(cc, `global', 3)
max_bay_ripc_map_set(fp, `global', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/isrvmaps.m4
```

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```
#
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#
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#
```

```
policy_module(polarismcp, 1.0);
```

```
# scooby device
type polaris_scooby_device_t;
dev_node(polaris_scooby_device_t)
```

```
# spa devices i.e sys_platform_module_1ng
type polaris_spa_device_t;
dev_node(polaris_spa_device_t)
```

```
# htdp device
type polaris_htdp_device_t;
dev_node(polaris_htdp_device_t)
```

```
# epaN and epactrlN devices
type polaris_epa_device_t;
```

```
dev_node(polaris_epa_device_t)

# luna_fpgs device
type polaris_luna_mbfpga_device_t;
dev_node(polaris_luna_mbfpga_device_t)

# dash fpga device (/dev/dash_fpga)
type polaris_dash_device_t;
dev_node(polaris_dash_device_t)

# astro device
type polaris_astro_device_t;
dev_node(polaris_astro_device_t)

# cpp_il device
type polaris_cpp_il_device_t;
dev_node(polaris_cpp_il_device_t)

# blzi_fpga device
type polaris_blzi_device_t;
dev_node(polaris_blzi_device_t)

# oob_evfc device
type polaris_oob_evfc_device_t;
dev_node(polaris_oob_evfc_device_t)

# ds31408 device
type polaris_ds31408_device_t;
dev_node(polaris_ds31408_device_t)

# icp_ads_ctl device
# Note that fugazi gets this from polarisqfp module
#ifdef(`fugazi_platform',`
type polaris_icp_device_t;
dev_node(polaris_icp_device_t)
')

type polaris_cpp_htdp_device_t;
dev_node(polaris_cpp_htdp_device_t)

type polaris_cbdma_device_t;
dev_node(polaris_cbdma_device_t)

type polaris_n2_device_t;
dev_node(polaris_n2_device_t)

type polaris_cy2213_device_t;
dev_node(polaris_cy2213_device_t)
```

```

type polaris_vega_device_t;
dev_node(polaris_vega_device_t)

# Fugazi makes use of fugazi_platform.tdl for IPCs and processes definition
# and it uses mcp_platform.tdl for databases definition. The below symbols
# are referred by mcp_platform.tdl but not fugazi_platform.tdl and hence these
# type definitions.
ifdef(`fugazi_platform',`
type polaris_fnf_agg_t;
')

optional_policy(`
# access to /dev/icp_XXX device on asr1k platforms
gen_require(`
    type polaris_cck_qat_t;
')
polaris_icp_dev_use(polaris_cck_qat_t)
dev_list_sysfs(polaris_cck_qat_t)
polaris_chasfs_read(polaris_cck_qat_t)
polaris_cpld_read(polaris_cck_qat_t)
polaris_tdlresolve_read(polaris_cck_qat_t)
')

# Handling denial for rsync_t for socket -
# comm="rsync" path="socket:[16784]" dev="sockfs" ino=16784
# scontext=system_u:system_r:rsync_t:s0 tcontext=system_u:system_r:init_t:s0
gen_require(`
    type rsync_t;
')
init_rw_stream_sockets(rsync_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismcp.te
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#
# June 2017, Victor Kamensky
#
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#

# polarisioxman file contexts place holder

/usr/binos/conf/shell_exec.sh -- gen_context(system_u:object_r:polaris_iox_shell_exec_t,s0)

/usr/binos/conf/run_ioxn_secure_dir.sh -- gen_context(system_u:object_r:polaris_iox_secure_dir_exec_t,s0)

```

```
/bin/cat9k_ssd_auth_cmds.sh -- gen_context(system_u:object_r:polaris_ssd_auth_exec_t,s0)
```

```
/tmp/trace/resource.log -- gen_context(system_u:object_r:polaris_iox_tmp_t,s0)
```

```
/tmp/screens(/.*) -- gen_context(system_u:object_r:screen_var_run_t,s0)
```

```
/tmp/.shell_exec(/.*) -- gen_context(system_u:object_r:polaris_iox2iosd_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisioxman.fc
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# August 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisbsm, 1.0);
```

```
gen_require(  
    type polaris_bsm_t;  
)
```

```
polaris_btrace_data_manage(polaris_bsm_t)  
polaris_chasfs_manage(polaris_bsm_t)  
polaris_tdlresolve_read(polaris_bsm_t)  
polaris_tdlldb_list_dirs(polaris_bsm_t)  
polaris_cpld_read(polaris_bsm_t)  
polaris_flashlib_read(polaris_bsm_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_bsm_t)
```

```
optional_policy(  
    polaris_bde_dev_use(polaris_bsm_t)  
)
```

```
allow polaris_bsm_t self:capability sys_nice;  
allow polaris_bsm_t self:process setsched;
```

```
# need access to /sys/devices/system/cpu/online  
dev_read_sysfs(polaris_bsm_t)
```

```
# handling /var/tmp/bsm_bcm_shell  
type polaris_bsm_bcm_shell_t;  
files_type(polaris_bsm_bcm_shell_t)  
gen_require(  
    type polaris_bsm_bcm_shell_t;  
)
```

```
type tmp_t;
')
filetrans_pattern(polaris_bsm_t, tmp_t, polaris_bsm_bcm_shell_t, fifo_file, "bsm_bcm_shell")
manage_fifo_files_pattern(polaris_bsm_t, tmp_t, polaris_bsm_bcm_shell_t)
```

```
ifdef(`vxe_family',`
# bind to BSM_AGENT_CLIENT_PORT port from bsm_tlv_init
corenet_tcp_bind_polaris_bsm_agent_client_port(polaris_bsm_t)
')
```

```
# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_bsm_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbsm.te
```

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
/tmp/sm_post_result -- gen_context(system_u:object_r:polaris_sif_mgr_tmp_t,s0)
```

```
/tmp/fips_status -- gen_context(system_u:object_r:polaris_sif_mgr_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissifmgr.fc
```

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```
#
# June 2020, Cuiyan Ma
#
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#
```

```
## <summary>Polaris polarisissucompcheck Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.if
```

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```
#
# March 2017, Victor Kamensky
#
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```

```

# All rights reserved
#

policy_module(polarisngwcplfmmgr, 1.0);

gen_require(
    type polaris_ngwc_plfm_mgr_t;
)

polaris_btrace_data_manage(polaris_ngwc_plfm_mgr_t)
polaris_crft_data_manage(polaris_ngwc_plfm_mgr_t)
polaris_chasfs_manage(polaris_ngwc_plfm_mgr_t)
polaris_tdlresolve_read(polaris_ngwc_plfm_mgr_t)
polaris_tdlldb_list_dirs(polaris_ngwc_plfm_mgr_t)
polaris_cpld_read(polaris_ngwc_plfm_mgr_t)
polaris_lua_read(polaris_ngwc_plfm_mgr_t)
polaris_flashlib_read(polaris_ngwc_plfm_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_ngwc_plfm_mgr_t)

corecmd_exec_bin(polaris_ngwc_plfm_mgr_t)
corecmd_exec_shell(polaris_ngwc_plfm_mgr_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_ngwc_plfm_mgr_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_ngwc_plfm_mgr_t)

allow polaris_ngwc_plfm_mgr_t self:capability { sys_rawio ipc_owner dac_override };
allow polaris_ngwc_plfm_mgr_t self:capability2 block_suspend;

polaris_obfl_data_manage(polaris_ngwc_plfm_mgr_t)

polaris_dyncfg_tmp_read(polaris_ngwc_plfm_mgr_t)

polaris_ngwc_shm_manage(polaris_ngwc_plfm_mgr_t)

# /dev/dmabmap usage
polaris_dmabmap_dev_use(polaris_ngwc_plfm_mgr_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_ngwc_plfm_mgr_t)

# open /dev/ttyS0 console in edison_platform_init
term_use_unallocated_ttys(polaris_ngwc_plfm_mgr_t)

polaris_disk_license_read(polaris_ngwc_plfm_mgr_t)

```

```

allow polaris_ngwc_plfm_mgr_t self:capability { chown fowner fsetid };

type polaris_ngwc_plfm_mgr_tmp_t;
files_tmp_file(polaris_ngwc_plfm_mgr_tmp_t)
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, dir, "mcu_upgrading")
manage_files_pattern(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
manage_dirs_pattern(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)

# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_ngwc_plfm_mgr_t)

# create /tmp/hw_entropy file anf fill with info from act2
polaris_hw_entropy_create(polaris_ngwc_plfm_mgr_t)

polaris_boot_tmp_read(polaris_ngwc_plfm_mgr_t)

polaris_flashlib_write(polaris_ngwc_plfm_mgr_t)

# check existence of /tmp/tam_cfg_done
polaris_tam_getattrs_tmp_dirs(polaris_ngwc_plfm_mgr_t)

# LOOK AT ME: Allow access to bootflash /flash/tam_client_app.log. file access
# remove after CSCvh66533 fixed
polaris_bootflash_manage(polaris_ngwc_plfm_mgr_t)

# scans /sys/devices/pci0000:00/0000:00:00.0
dev_read_sysfs(polaris_ngwc_plfm_mgr_t)

# rsync nvram_config file accross stack
#rsync_exec(polaris_ngwc_plfm_mgr_t)
gen_require(`
    type rsync_t;
`)
rsync_entry_domtrans(polaris_ngwc_plfm_mgr_t, rsync_t)
allow rsync_t polaris_ngwc_plfm_mgr_t:process sigchld;
# write access to /dev/ttyS0
term_write_unallocated_ttys(rsync_t)

# reads from, populates chasfs with values and deletes /tmp/package_biv_sums
polaris_kgv_data_manage(polaris_ngwc_plfm_mgr_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_ngwc_plfm_mgr_t)
`)

```

```
# platform manager moves 00001.nvram_config file to /bootflash/nvram_config
polaris_nvram_manage(polaris_ngwc_plfm_mgr_t)
allow polaris_ngwc_plfm_mgr_t self:process setfscreate;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcplfmgr.te
No license file was found, but licenses were detected in source scan.
```

```
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#
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#
```

```
policy_module(polarisgrmgr, 1.0);
```

```
gen_require(
    type polaris_gr_mgr_t;
)
```

```
polaris_crft_data_manage(polaris_gr_mgr_t)
polaris_chasfs_manage(polaris_gr_mgr_t)
polaris_tdlresolve_read(polaris_gr_mgr_t)
polaris_cpld_read(polaris_gr_mgr_t)
polaris_lua_read(polaris_gr_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_gr_mgr_t)
```

```
allow polaris_gr_mgr_t self:capability { dac_override dac_read_search };
#DB persistence
polaris_tdlpersist_setup(polaris_gr_mgr_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.te
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```

```
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#
```

```
# ngio devices
/dev/ngio[0-9]* -c gen_context(system_u:object_r:polaris_ngio_device_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiomd.fc

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#

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#

/tmp/idope\_svr gen\_context(system\_u:object\_r:polaris\_fed\_debug\_sock\_t,s0)

/tmp/shfwd\_svr gen\_context(system\_u:object\_r:polaris\_fed\_debug\_sock\_t,s0)

/tmp/pktgen.txt gen\_context(system\_u:object\_r:polaris\_fed\_debug\_tmp\_t,s0)

/tmp/DopeElam.sh gen\_context(system\_u:object\_r:polaris\_fed\_debug\_tmp\_t,s0)

/tmp/MemDumpElam.sh gen\_context(system\_u:object\_r:polaris\_fed\_debug\_tmp\_t,s0)

/dcmlog.txt -- gen\_context(system\_u:object\_r:polaris\_fed\_debug\_dcmlog\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.fc

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#

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#

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#

policy\_module(polariscpld, 1.0);

#####

# CPLD Driver policy

#####

# note polaris\_sysfs\_cpld\_t is defined in kernel/devices.te, since genfscon statements

# could be only in base policy

type polaris\_cpld\_device\_t;

dev\_node(polaris\_cpld\_device\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpld.te

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#

```

# August 2017, Shawn Lu
#
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#

policy_module(polarisrogued, 1.0);

gen_require(
    type polaris_rogued_t;
)

polaris_btrace_data_manage(polaris_rogued_t)
polaris_chasfs_manage(polaris_rogued_t)
polaris_tdlresolve_read(polaris_rogued_t)
polaris_tdlldb_list_dirs(polaris_rogued_t)
polaris_cpld_read(polaris_rogued_t)
polaris_lua_read(polaris_rogued_t)
polaris_flashlib_read(polaris_rogued_t)

polaris_ripc_sman_ui_serv_connect(polaris_rogued_t)

polaris_db_tdlldb_dir_use(polaris_rogued_t)

# allow to use setrlimit
allow polaris_rogued_t self:process setrlimit;
allow polaris_rogued_t self:capability sys_resource;
allow polaris_rogued_t self:capability dac_override;

# stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_rogued_t)
polaris_socketat_nsfs_read(polaris_rogued_t)

## allow to open udp socket on RDLP port 6532
corenet_udp_bind_polaris_rdlp_port(polaris_rogued_t)
corenet_udp_bind_generic_node(polaris_rogued_t)
allow polaris_rogued_t self:udp_socket { create_socket_perms recv_msg send_msg };

# reading images/ap_capabilities.xml
polaris_wlc_ap_images_read(polaris_rogued_t)

# syslogs in RLDP
logging_send_syslog_msg(polaris_rogued_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_rogued_t)
polaris_tmp_tdlldb_persist_setup(polaris_rogued_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrogued.te

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#

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#

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#

policy\_module(polariscmm, 1.0);

gen\_require(^

    type polaris\_cmm\_t;

')

polaris\_btrace\_data\_manage(polaris\_cmm\_t)

polaris\_crft\_data\_manage(polaris\_cmm\_t)

polaris\_chasfs\_manage(polaris\_cmm\_t)

polaris\_tdlresolve\_read(polaris\_cmm\_t)

polaris\_tdlldb\_list\_dirs(polaris\_cmm\_t)

polaris\_cpld\_read(polaris\_cmm\_t)

polaris\_flashlib\_read(polaris\_cmm\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_cmm\_t)

allow polaris\_cmm\_t self:capability dac\_override;

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmm.te

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Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_base\_ripc\_if.m4

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_mqipc\_fc.m4

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_process\_fc.m4

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#

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#

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#

```
# polarisofa file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisofa.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
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```

```
#
```

```
## <summary>Polaris emd Policy Rules.</summary>
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisemd.if
```

```
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```

```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

```
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```

```
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```

```
#
```

```
policy_module(polariscaf, 1.0);
```

```
gen_require(`
```

```
    type polaris_caf_t;
```

```
    type polaris_caf_exec_t;
```

```
    type usr_t;
```

```
`)
```

```
ifdef(`nyquist_platform',`
```

```
gen_require(`
```

```
    type polaris_sioxcd_rp_t;
```

```
`)
```

```
# Allow read of /etc/passwd
```

```
auth_map_passwd(polaris_sioxcd_rp_t)
```

```
# Allow usage of ls in helper script
```

```
corecmd_exec_bin(polaris_sioxcd_rp_t)
```

```
# Allow sysfs read
```

```
dev_list_sysfs(polaris_sioxcd_rp_t)
```

```
# Allow create/write/open of files under tmp
type polaris_sioxcd_rp_tmp_t;
files_tmp_file(polaris_sioxcd_rp_tmp_t)
files_tmp_filetrans(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, { dir file } )
manage_dirs_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_fifo_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)

# Allow losetup in helper script to run in its own domain
fstools_domtrans(polaris_sioxcd_rp_t)

# Allow mount/umount in its own domain
mount_domtrans(polaris_sioxcd_rp_t)

# Allow /tmp/sw/boot read
polaris_boot_tmp_read(polaris_sioxcd_rp_t)

# Allow /tmp/tmppub read
polaris_btrace_tmppub_read(polaris_sioxcd_rp_t)

# Allow iox_polaris.conf read
polaris_caf_files_read(polaris_sioxcd_rp_t)

# Allow chasfs access
polaris_chasfs_manage(polaris_sioxcd_rp_t)

# Allow /sys/devices/platform/cpld/board_vtype read
polaris_cpld_read(polaris_sioxcd_rp_t)

# Allow debug.conf access
polaris_read_debug_conf(polaris_sioxcd_rp_t)

# Allow cats /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_sioxcd_rp_t)

# Allow console logging
term_open_unallocated_ttys(polaris_sioxcd_rp_t)

# Allow capability 1/24 access
allow polaris_sioxcd_rp_t self:capability { dac_override sys_resource };

# Transition to chvrf domain needed by push_using_rsync
polaris_chvrf_domtrans(polaris_sioxcd_rp_t)

# Allow flashutil
polaris_flashlib_read(polaris_sioxcd_rp_t)

# logger needs to run pidof
```

```

dev_read_sysfs(polaris_sioxcd_rp_t)
kernel_read_system_state(polaris_sioxcd_rp_t)
domain_read_all_domains_state(polaris_sioxcd_rp_t)

# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_sioxcd_rp_t)

# Allow ls /tmp/ufs/crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_sioxcd_rp_t)
`)

# Allow logger which is used for syslog messages
allow polaris_sioxcd_rp_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_sioxcd_rp_t)

# Allow standby to access /dev/sda3
fs_getattr_xattr_fs(polaris_sioxcd_rp_t)

# Allow getattr under iox_alt_hdd_mount_dir
polaris_iox_alt_hdd_getattr(polaris_sioxcd_rp_t)
`)

polaris_chasfs_manage(polaris_caf_t)
polaris_btrace_data_manage(polaris_caf_t)
polaris_cpld_read(polaris_caf_t)
polaris_boot_tmp_read(polaris_caf_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_caf_t)

corecmd_exec_bin(polaris_caf_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_caf_t)

# run-caf.sh invokes startup.py. This leads to node_t:tcp_socket node_bind
corenet_tcp_bind_generic_node(polaris_caf_t)

allow polaris_caf_t self:capability { net_admin sys_resource };
allow polaris_caf_t self:tcp_socket { accept listen create_socket_perms };
allow polaris_caf_t self:udp_socket create_socket_perms;
allow polaris_caf_t self:unix_dgram_socket { create_socket_perms sendto };
allow polaris_caf_t self:cap_usersn { sys_admin sys_ptrace setgid setuid sys_chroot };

# df needs to have getattr on many file/dir/fs
fs_getattr_all_fs(polaris_caf_t)
fs_getattr_all_files(polaris_caf_t)

```

```

files_getattr_all_dirs(polaris_caf_t)
dev_getattr_all_chr_files(polaris_caf_t)
files_getattr_all_mountpoints(polaris_caf_t)

# df on "/" needs fs_t:filesystem getattr
fs_getattr_xattr_fs(polaris_caf_t)

# allow execution of /usr/sbin/brctl
brctl_domtrans(polaris_caf_t)

#allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_caf_t)
fs_list_cgroup_dirs(polaris_caf_t)

# add new type for /guestshell files and allow CAF to manage them
type polaris_guestshell_t;
files_type(polaris_guestshell_t)
manage_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)
manage_lnk_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)
manage_dirs_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)

#required to support, guestshell enable, which creates <i>i</i>iox-storage>/iox/repo/guestshell
relabelto_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)

# run_iioxn_caf.sh invokes run-caf.sh which executes "ip"
sysnet_domtrans_ifconfig(polaris_caf_t)
# allow netns operations
sysnet_manage_ifconfig_run(polaris_caf_t)

libs_domtrans_ldconfig(polaris_caf_t)

# add new type for /bootflash/iox files and allow CAF to manage them
type polaris_iox_files_t;
polaris_disk_type(polaris_iox_files_t)
polaris_iox_files_manage(polaris_caf_t)

# need open, read, ioctl, getattr on /bootflash/debug.conf
polaris_read_debug_conf(polaris_caf_t)

# run_iioxn_caf.sh cats /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_caf_t)

# pvsm_cpu.sh reads /tmp/cgroup.log
optional_policy(`
polaris_vman_tmp_manage(polaris_caf_t)
`)

# allow to read /proc/cpuinfo

```

```

kernel_read_system_state(polaris_caf_t)

optional_policy(
container_runtime_domtrans(polaris_caf_t)
)

# add new type for /opt/cisco/caf files and allow CAF to manage them
type polaris_caf_files_t;
files_type(polaris_caf_files_t)
files_root_filetrans(polaris_caf_t, polaris_caf_files_t, dir)
files_root_filetrans(polaris_caf_t, polaris_caf_exec_t, dir, "scripts")
manage_dirs_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)
manage_files_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)
manage_lnk_files_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)

gen_require(
    type polaris_hm_t;
)
polaris_caf_files_read(polaris_hm_t)

# this label is created for sharing of core file dirs between host and containers
type polaris_caf_core_files_t;
polaris_disk_type(polaris_caf_core_files_t)
# transition /local files and dirs
files_root_filetrans(polaris_caf_t, polaris_caf_core_files_t, dir, "local")
polaris_btrace_data_manage(polaris_caf_core_files_t)
manage_files_pattern(polaris_caf_core_files_t, usr_t, usr_t)

# manage local core files between host and container
polaris_caf_local_core_files_manage(polaris_caf_t)
polaris_caf_local_core_files_manage(brctl_t)

# run_ioxn_caf.sh invokes startup.py that eventually through resourcemanager.py
# calls cpu_count_logical function in order to get number of cores and which
# needs read access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_caf_t)

# run-caf.sh modifies iox_polaris.conf; backup is saved due to "sed-i.bak".
# in order to preserve security context, setfscreate is invoked
allow polaris_caf_t self:process setfscreate;

# work with /var/log/caf/ files
type polaris_caf_log_t;
logging_log_file(polaris_caf_log_t)
manage_files_pattern(polaris_caf_t, polaris_caf_log_t, polaris_caf_log_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_log_t, polaris_caf_log_t)
logging_log_filetrans(polaris_caf_t, polaris_caf_log_t, dir, "caf")
logging_log_filetrans(polaris_caf_t, polaris_caf_log_t, dir, "docker")

```

```

corenet_tcp_bind_polaris_caf_api_port(polaris_caf_t)

virt_stream_connect(polaris_caf_t)
virt_read_config(polaris_caf_t)

# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_caf_t)

# allow access to /etc/guestshell_rsa_key* files
type polaris_guestshell_ssh_key_t;
files_type(polaris_guestshell_ssh_key_t)
files_etc_filetrans(polaris_caf_t, polaris_guestshell_ssh_key_t, file, "guestshell_rsa_key")
files_etc_filetrans(polaris_caf_t, polaris_guestshell_ssh_key_t, file, "guestshell_rsa_key.pub")
manage_files_pattern(polaris_caf_t, polaris_guestshell_ssh_key_t, polaris_guestshell_ssh_key_t)

# add new type for "internal" temp files created by underlying python modules when
# user-level python scripts (e.g., run_ioxn_caf.sh, run-caf.sh, etc) performs init;
# we are now creating them using TMPDIR=/tmp/caf; and, allow CAF to manage these
# internal temp files; in addition, underlying python-infra invokes __mmap() that
# somehow translates to.... execute stuff like "/tmp/caf/#97893 (deleted)"
type polaris_caf_tmp_files_t;
files_tmp_file(polaris_caf_tmp_files_t)
files_tmp_filetrans(polaris_caf_t, polaris_caf_tmp_files_t, dir)
files_tmp_filetrans(polaris_caf_t, polaris_caf_tmp_files_t, file)
manage_files_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
# python through libffi tries to mmap open file with PROT_EXEC, it triggers need
# for execute permission
allow polaris_caf_t polaris_caf_tmp_files_t:file execute;
allow polaris_caf_t polaris_caf_tmp_files_t:file map;

# python3 seems to do a setattr syscall
# A folder like /bootflash/iox/repo/guestshell/extract_archive
# contains files that are extracted from a tarball and are
# made polaris_caf_tmp_files_t because of the files_tmp_filetrans rule
relabel_files_pattern(polaris_caf_t, polaris_iox_files_t, polaris_iox_files_t)
relabel_files_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)

# allow to run e2fsck in its own domain
fstools_domtrans(polaris_caf_t)

# allow to run mount in its own domain
mount_domtrans(polaris_caf_t)

# add new type for /guestshell/*.sh files
type polaris_guestshell_exec_t;
files_type(polaris_guestshell_exec_t)

```

```

# add new type for /var/run/netns/guestshell
type polaris_guestshell_var_run_t;
files_type(polaris_guestshell_var_run_t)

# add new type for /var/run/cisco_cli
type polaris_caf_var_run_t;
files_pid_file(polaris_caf_var_run_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_var_run_t, polaris_caf_var_run_t)
manage_files_pattern(polaris_caf_t, polaris_caf_var_run_t, polaris_caf_var_run_t)
files_pid_filetrans(polaris_caf_t, polaris_caf_var_run_t, { file dir })

# Intermediate step: When CAF unpacks the contents of the application
# you upload, it will stage the contents somewhere and verify some checks
# (filesystem check on the disk image, existence of several folders, etc.). Disk
# images are mounted without any label since CAF has not generated security
# labels yet for the app at this point. The disk gets unmounted and eventually
# gets mounted again with the proper context/label.
type polaris_disk_caf_t;
polaris_disk_type(polaris_disk_caf_t)
list_dirs_pattern(polaris_caf_t, polaris_disk_caf_t, polaris_disk_caf_t)

allow polaris_caf_t self:capability { chown dac_override fowner fsetid setfcap sys_chroot sys_ptrace };
allow polaris_caf_t self:process setcap;
fs_read_nsfs_files(polaris_caf_t)

# caf to manage loop device: finding free /dev/loopN device
dev_rw_loop_control(polaris_caf_t)

# PLEASE LOOK AT ME
# allow caf to read, write /dev/loopN devices that are
# under fixed_disk_device_t label. It is pretty strong premission
# and at this point it is only done for /dev/loopN devices.
# Can we do better? i.e move /dev/loopN to some other label?
storage_manage_fixed_disk(polaris_caf_t)

# caf executing chroot via bash
gen_require(
    type svirt_sandbox_file_t;
)
allow polaris_caf_t svirt_sandbox_file_t:file { execute execute_no_trans };

gen_require(
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
)
setattr_dirs_pattern(polaris_caf_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
# replicating policy done for polaris_disk_bootflash_t

```

```

setattr_dirs_pattern(polaris_caf_t, polaris_disk_harddisk_t, polaris_disk_harddisk_t)

# caf connects to its own port 8098
corenet_tcp_connect_polaris_caf_api_port(polaris_caf_t)

virt_manage_sandbox_files(polaris_caf_t)

kernel_read_network_state(polaris_caf_t)

polaris_bootflash_manage(polaris_caf_t)
polaris_bootflash_files_mmap(polaris_caf_t)
#allow polaris_disk_harddisk_t manage like polaris_disk_bootflash_t
polaris_harddisk_manage(polaris_caf_t)

# caf execve virsh
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_caf_t, virsh_exec_t, virsh_t)
# virsh needs to read /opt/cisco/caf/scripts/ieobcbr.xml
polaris_caf_files_read(virsh_t)

# caf calls tipc-config that works with tipc sockets
allow polaris_caf_t self:socket create_socket_perms;
allow polaris_caf_t self:netlink_generic_socket { create_socket_perms sendto recvfrom };

# get and set attrs on httpd_var_run_t under /bootflash/iox
gen_require(
    type httpd_var_run_t;
)
getattr_sock_files_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
setattr_sock_files_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
manage_dirs_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
# allow TCP connection for http port e.g. Local Manager
corenet_tcp_connect_http_port(polaris_caf_t)

# execute lvm commands, like lvs
lvm_domtrans(polaris_caf_t)

polaris_disk_crashinfo_getattr(polaris_caf_t)
optional_policy(
    polaris_ncd_tmp_read(polaris_caf_t)
)

logging_send_syslog_msg(polaris_caf_t)

# tries to load KLM like cuse, fuse, overlay

```

```

modutils_domtrans_insmo(polaris_caf_t)

# modifies files under /var/www/features/iox
apache_manage_sys_content(polaris_caf_t)

# caf reads version of ioxman from its executable
polaris_ioxman_exec_read(polaris_caf_t)

polaris_ioxman_show_version(polaris_caf_t)

type polaris_iox_alt_hdd_files_t;
files_type(polaris_iox_alt_hdd_files_t)
polaris_pfile_type(polaris_iox_alt_hdd_files_t)
polaris_iox_alt_hdd_manage(polaris_caf_t)

# On stargazer platform /vol/disk0 is used by iox to create below dirs.
# On nyquist platform /vol/usb1 with polaris_disk_harddisk_t is used
# Transition them to appropriate labels.
gen_require(
    type container_var_lib_t;
)

filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_caf_tmp_files_t, dir, "caf")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t
polaris_iox_files_t }, container_var_lib_t, dir, "docker")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox_data_share")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox_host_data_share")

# Allow files under guest-share directory which is shared between ios
# and container
type polaris_iox_shared_files_t;
files_type(polaris_iox_shared_files_t)
polaris_pfile_type(polaris_iox_shared_files_t)
manage_dirs_pattern(polaris_caf_t, polaris_iox_shared_files_t, polaris_iox_shared_files_t)
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_shared_files_t, dir, "guest-share")

# Allow signature verification of applications
gen_require(
    type polaris_code_verify_t;
)
polaris_iox_files_manage(polaris_code_verify_t)

```

```

# allow caf to control /tmp/trace/resource.log
polaris_iox_manage_tmp_files(polaris_caf_t)

# some utility running under caf needs access to /varied/ovf-env.xml
polaris_disk_varied_read(polaris_caf_t)

# caf reads the udev information
gen_require(
    type udev_var_run_t;
)
manage_files_pattern(polaris_caf_t, udev_var_run_t, udev_var_run_t)

gen_require(
    type virtd_lxc_t;
)
allow polaris_caf_t virtd_lxc_t:process signull;

polaris_removable_manage(polaris_caf_t)
polaris_lm_tmp_read(polaris_caf_t)

# caf modifies /etc/cgroup_params.txt
files_manage_etc_files(polaris_caf_t)

# read /tmp/iox_override.conf created by ioxman
polaris_iox_read_tmp_files(polaris_caf_t)

# python udev library used by caf
allow polaris_caf_t self:netlink_kobject_uevent_socket { bind create getattr setopt };

#need access to rawip socket by pd_iox.sh
allow polaris_caf_t self:capability { net_raw setgid };
allow polaris_caf_t self:rawip_socket { create getopt setopt };
# LOOK AT ME caf leaks fifo file descriptors need permissions for
# domains that started by it
gen_require(
    type iptables_t;
)
allow iptables_t polaris_caf_t:fifo_file { read write append getattr };

# allow iptables_t usersn permissions for IP accessed by the script guestshell_setup.sh
allow iptables_t self:cap_usersn { net_admin net_raw };

container_stream_connect(polaris_caf_t)

gen_require(
    type pki_ca_port_t;
)
allow polaris_caf_t pki_ca_port_t:tcp_socket name_connect;

```

```

polaris_flashlib_read(polaris_caf_t)
polaris_flashlib_write(polaris_caf_t)
polaris_contdev_dev_read(polaris_caf_t)

gen_require(
    type rsync_exec_t;
    type rsync_port_t;
)
allow polaris_caf_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
allow polaris_caf_t rsync_port_t:tcp_socket name_connect;

# IOX uses rsync to sync the data
gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_caf_t, rsync_t)
polaris_manage_rsync_tmplog_dir(polaris_caf_t)
allow rsync_t polaris_caf_t:fifo_file { getattr write };

kernel_search_network_sysctl(polaris_caf_t)
kernel_rw_net_sysctls(polaris_caf_t)
dev_rw_sysfs(polaris_caf_t)

# Allow run-caf.sh to configure byte_queue_limits/limit_min for KR port
gen_require(
    type sysfs_t;
)
allow polaris_caf_t sysfs_t:file create;
dev_manage_sysfs_dirs(polaris_caf_t)

# CAF needs access to setup for containers
manage_dirs_pattern(polaris_caf_t, self, self)
fs_associate_proc(polaris_caf_t)

# guestshell_setup.sh reads /proc/sys/kernel/core_pattern
kernel_read_usermodehelper_state(polaris_caf_t)
# and then guestshell_setup.sh reads /tmp/corelink
gen_require(
    type initrc_tmp_t;
)
allow polaris_caf_t initrc_tmp_t:lnk_file read;

# Beluga/Meraki container
ifdef(`ms_platform',`
polaris_iox_container_domtrans(polaris_caf_t)
)
# Bottlenose/Meraki container

```

```

ifdef(`bottlenose_platform',`
polaris_iox_container_domtrans(polaris_caf_t)
')

#allow run_ioxn_caf.sh to modify /etc/docker/daemon.json, etc.
container_manage_config_files(polaris_caf_t)

# Manage IOx Secure storage CC files
type polaris_iox_ss_disk_t;
files_type(polaris_iox_ss_disk_t)
polaris_pfile_type(polaris_iox_ss_disk_t)

#Guestshell management
virt_signull(polaris_caf_t)

gen_require(`
    type ifconfig_t;
')
# allow ifconfig_t usersn permissions for IP
allow ifconfig_t self:cap_usersn { net_admin sys_admin sys_ptrace };
# allow ifconfig_t to transition into dhcpc domain
sysnet_domtrans_dhcpc(ifconfig_t)

# Being an IOSPP client does not allow for setattr permissions
gen_require(`
    type polaris_iosd_portal_app_lipc_t;
')
setattr_sock_files_pattern(polaris_caf_t, polaris_iosd_portal_app_lipc_t, polaris_iosd_portal_app_lipc_t)

ifdef(`passport_platform',`

gen_require(`
    type polaris_sioxcd_rp_t;
')

# Allow read of /etc/passwd
auth_map_passwd(polaris_sioxcd_rp_t)
#
# Allow usage of ls in helper script
corecmd_exec_bin(polaris_sioxcd_rp_t)

# Allow sysfs read
dev_list_sysfs(polaris_sioxcd_rp_t)

# Allow create/write/open of files under tmp
type polaris_sioxcd_rp_tmp_t;

```

```

files_tmp_file(polaris_sioxcd_rp_tmp_t)
files_tmp_filetrans(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, { dir file } )
manage_dirs_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_fifo_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)

# Allow losetup in helper script to run in its own domain
fstools_domtrans(polaris_sioxcd_rp_t)
#
# # Allow mount/umount in its own domain
mount_domtrans(polaris_sioxcd_rp_t)
#
# # Allow /tmp/sw/boot read
polaris_boot_tmp_read(polaris_sioxcd_rp_t)

# # Allow /tmp/tmppub read
polaris_btrace_tmppub_read(polaris_sioxcd_rp_t)

# # Allow iox_polaris.conf read
polaris_caf_files_read(polaris_sioxcd_rp_t)
#
# Allow chasfs access
polaris_chasfs_manage(polaris_sioxcd_rp_t)

# Allow /sys/devices/platform/cpld/board_vtype read
polaris_cpld_read(polaris_sioxcd_rp_t)

# Allow debug.conf access
polaris_read_debug_conf(polaris_sioxcd_rp_t)

# Allow cats /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_sioxcd_rp_t)

# Allow console logging
term_open_unallocated_ttys(polaris_sioxcd_rp_t)

# Allow capability 1/24 access
allow polaris_sioxcd_rp_t self:capability { dac_override sys_resource };

# Transition to chvrf domain needed by push_using_rsync
polaris_chvrf_domtrans(polaris_sioxcd_rp_t)

# Allow flashutil
polaris_flashlib_read(polaris_sioxcd_rp_t)

#iptables execute in its own domain
iptables_domtrans(polaris_caf_t)

```

```

# logger needs to run pidof
dev_read_sysfs(polaris_sioxcd_rp_t)
kernel_read_system_state(polaris_sioxcd_rp_t)
domain_read_all_domains_state(polaris_sioxcd_rp_t)

# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_sioxcd_rp_t)

# Allow ls /tmp/ufs/crashinfo
optional_policy(
polaris_ncd_tmp_read(polaris_sioxcd_rp_t)
')

# Allow logger which is used for syslog messages
allow polaris_sioxcd_rp_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_sioxcd_rp_t)

# Allow standby to access /dev/sda3
fs_getattr_xattr_fs(polaris_sioxcd_rp_t)

# Allow getattr under iox_alt_hdd_mount_dir
polaris_iox_alt_hdd_getattr(polaris_sioxcd_rp_t)
')

# Allow sync_data to use chvrf
polaris_chvrf_domtrans(polaris_caf_t)

#tty device and link files under /dev
type polaris_caf_tty_file_t;
dev_node(polaris_caf_tty_file_t)
dev_filetrans(polaris_caf_t, polaris_caf_tty_file_t, lnk_file)
term_use_ptmx(polaris_caf_t)
polaris_caf_tty_lnk_manage(polaris_caf_t)
polaris_caf_chr_file_read(polaris_caf_t)

polaris_iosd_vcpu_read(polaris_caf_t)

# Allow access starting/stopping iox
polaris_chasfs_read(iptables_t)
polaris_chasfs_read(ifconfig_t)
polaris_hman_use_fifo(polaris_caf_t)
iptables_domtrans(polaris_caf_t)

# Allow application signature verification
polaris_code_verify_domtrans(polaris_caf_t)

#access /proc/rmonbifo file cat9k-ioxhelper.sh
polaris_proc_rmonbifo_read(polaris_caf_t)

```

```

gen_require(
    type dhcp_t;
)
# allow these users capabilities for dhcp
allow dhcp self:cap_users { net_raw net_bind_service };
# allow CAF to transition to dhcp e.g. dhclient_custom.sh
sysnet_domtrans_dhcp(polaris_caf_t)
# allow reading of dhcp configuration files e.g.
# /vol/usb1/iox/repo-docker/perfsonar1/dhcp/dhcp_eth0.conf
polaris_caf_files_read(dhcp_t)
# allow writing of dhcp lease files e.g. eth0ipv4.lease
polaris_iox_files_manage(dhcp_t)
# allow dhcp domain to transition back into CAF e.g. dhclient_custom.sh
polaris_caf_domtrans(dhcp_t)

# Allow read container share files
container_read_share_files(polaris_caf_t)

# Allow manage container files
gen_require(
    type container_file_t;
    type container_share_t;
    type container_log_t;
)
mmap_files_pattern(polaris_caf_t, container_file_t, container_file_t)
manage_files_pattern(polaris_caf_t, container_file_t, container_file_t)

manage_chr_files_pattern(polaris_caf_t, container_share_t, container_share_t)
manage_fifo_files_pattern(polaris_caf_t, container_share_t, container_share_t)
manage_sock_files_pattern(polaris_caf_t, container_share_t, container_share_t)

manage_files_pattern(polaris_caf_t, container_log_t, container_log_t)

# Allow polaris caf to set attributes of device nodes of fuse devices
gen_require(
    type fuse_device_t;
)
allow polaris_caf_t fuse_device_t:chr_file setattr;

# Allow polaris caf to set attributes of TUN/TAP virtual network device
gen_require(
    type tun_tap_device_t;
)
allow polaris_caf_t tun_tap_device_t:chr_file setattr;

# Allow operations on fifo file
type fifo_var_run_t;

```

```

# make sure /tmp/ttyF0 is labeled correctly
files_tmp_file(fifo_var_run_t)
files_tmp_filetrans(polaris_caf_t, fifo_var_run_t, fifo_file)
manage_fifo_files_pattern(polaris_caf_t, fifo_var_run_t, fifo_var_run_t)

# allow udev read operations
polaris_udev_tmp_read(polaris_caf_t)

# allow link file for tmpfs_t
allow polaris_caf_t tmpfs_t:lnk_file create;

#####
# IOx Secure storage service policies
#####
optional_policy(`
gen_require(`
    type polaris_ioxss_rp_t;
    type polaris_sort_files_t;
    type polaris_iosd_t;
`)
type polaris_ioxss_rp_tmp_t;
files_tmp_file(polaris_ioxss_rp_tmp_t)
files_tmp_filetrans(polaris_ioxss_rp_t, polaris_ioxss_rp_tmp_t, file, "ioxss_up")
polaris_ioxss_rp_tmp_manage(polaris_ioxss_rp_t)

polaris_chasfs_read(polaris_ioxss_rp_t)
polaris_lua_read(polaris_ioxss_rp_t)

manage_files_pattern(polaris_ioxss_rp_t, polaris_iox_ss_disk_t, polaris_iox_ss_disk_t)
allow polaris_sort_files_t polaris_iox_ss_disk_t:dir list_dir_perms;
allow polaris_iosd_t polaris_iox_ss_disk_t:dir list_dir_perms;

# Allow polaris_sort_files_t getattr of iosd_portal_app_lipc socket file
polaris_iosd_portal_app_lipc_getattr(polaris_sort_files_t)

# allow secure storage server to connect through tcp_socket on port 9000 from system-config.ini
gen_require(`
    type http_port_t;
`)

allow polaris_ioxss_rp_t self:tcp_socket { bind create listen setopt };
corenet_tcp_bind_http_port(polaris_ioxss_rp_t);
allow polaris_ioxss_rp_t node_t:tcp_socket node_bind;

# allow polaris_caf to process signal of dhcpd client
allow polaris_caf_t dhcpd_t:process signal;

# allow secure storage server to connect through socket

```

```

allow polaris_ioxss_rp_t self:socket create_socket_perms;
')

optional_policy(`
# Allow polaris_sort_files_t getattr of container fifo file
gen_require(`
    type polaris_sort_files_t;
    type container_file_t;
`)
getattr_fifo_files_pattern(polaris_sort_files_t, container_file_t, container_file_t)
`)

# Clear iox handling
container_manage_lib_files(polaris_caf_t)
container_manage_lib_dirs(polaris_caf_t)
container_manage_share_files(polaris_caf_t)
container_manage_share_dirs(polaris_caf_t)
gen_require(`
    type polaris_vs_oper_db_tdlldb_t;
    type polaris_tdlldb_t;
`)
manage_files_pattern(polaris_caf_t, polaris_tdlldb_t, polaris_vs_oper_db_tdlldb_t)

# allow caf to read systemd unit files
systemd_read_unit_files(polaris_caf_t)

# allow restorecon on iox_alt_hdd_mount_dir
seutil_domtrans_setfiles(polaris_caf_t)

filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_iox_alt_hdd_files_t,
file, "iox_alt_hdd.dsk")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_iox_alt_hdd_files_t,
dir, "iox_alt_hdd_mount_dir")

allow ifconfig_t polaris_iox_files_t:file { read };

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscaf.te

No license file was found, but licenses were detected in source scan.

```

#
# May 2017, Victor Kamensky
#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#

```

```

## <summary>Polaris confd Policy Rules.</summary>

```

```
#####
## <summary>
##   Setup /dev/shm/confd directory and file, pid and shared memory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_conf_d_shm_setup',`
    gen_require(`
        type polaris_conf_d_shm_t;
        type tmpfs_t;
    `)
    fs_tmpfs_filetrans($1, polaris_conf_d_shm_t, dir, "confd")
    manage_dirs_pattern($1, tmpfs_t, polaris_conf_d_shm_t)
    manage_files_pattern($1, { tmpfs_t polaris_conf_d_shm_t }, polaris_conf_d_shm_t)
    allow $1 polaris_conf_d_shm_t:file map;
)`)

```

```
#####
## <summary>
##   Read /dev/shm/confd_shared_schema shared memory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_conf_d_shared_schema_read',`
    gen_require(`
        type polaris_conf_d_shm_t;
        type tmpfs_t;
    `)
    read_files_pattern($1, { tmpfs_t polaris_conf_d_shm_t } , polaris_conf_d_shm_t)
    allow $1 polaris_conf_d_shm_t:file map;
)`)

```

```
#####
## <summary>
##   Watch confd_shm directories
## </summary>
## <param name="domain">
##   <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_conf_d_shared_schema_watch`,`
gen_require(`
type polaris_conf_d_shm_t;
`)
allow $1 polaris_conf_d_shm_t:dir watch;
`)

#####
## <summary>
## Read /proc/cond_pid/exe file. Few dmi utilities do that by
## some reason. Look at handle_conf_d_pid_available.
## Read files and symlinks under /dev/shm/confd.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_read`,`
gen_require(`
type polaris_conf_d_t;
`)
read_files_pattern($1, polaris_conf_d_t, polaris_conf_d_t)
read_lnk_files_pattern($1, polaris_conf_d_t, polaris_conf_d_t)
`)

#####
## <summary>
## Create /var/log/ndbutil directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_ndbutil_create`,`
gen_require(`
type polaris_conf_d_ndbutil_lock_t;
`)
files_lock_filetrans($1, polaris_conf_d_ndbutil_lock_t, dir, "ndbutil")
`)

```

```

files_create_lock_dirs($1)
manage_dirs_pattern($1, polaris_confd_ndbutil_lock_t, polaris_confd_ndbutil_lock_t)
manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_confd_ndbutil_lock_t)
create_dirs_pattern($1, polaris_confd_ndbutil_lock_t, polaris_confd_ndbutil_lock_t)
')

```

```
#####
```

```

## <summary>
## Creates types for and rules for ndbutils files under /var/lock/ndbutil
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_ndbutil_t
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#

```

```

template(`polaris_ndbutil_lock_template`,`
  gen_require(`
    type polaris_confd_ndbutil_lock_t;
  `)
  type polaris_${2}_ndbutil_t;
  files_type(polaris_${2}_ndbutil_t)

  filetrans_pattern($1, polaris_confd_ndbutil_lock_t, polaris_${2}_ndbutil_t, file, $3)
  manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_${2}_ndbutil_t)

  allow $1 polaris_${2}_ndbutil_t:file { watch watch_reads };
)

```

```
#####
```

```

## <summary>
##   Execute a domain transition to run mmap_schema polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>

```

```
#
interface(`polaris_mmap_schema_domtrans`,`
    gen_require(`
        type polaris_mmap_schema_t, polaris_mmap_schema_exec_t;
    `)

    domtrans_pattern($1, polaris_mmap_schema_exec_t, polaris_mmap_schema_t)
`)
```

```
#####
## <summary>
##   Execute a domain transition to run confd polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
```

```
interface(`polaris_confdomtrans`,`
    gen_require(`
        type polaris_confdom_t, polaris_confdom_exec_t;
    `)

    domtrans_pattern($1, polaris_confdom_exec_t, polaris_confdom_t)
`)
```

```
#####
## <summary>
##   Read confd log file (i.e /var/confd0/log/cia-confd.log). Used
## by dmiaudthd to convert confd logs to btrace.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_confdom_log_read`,`
    gen_require(`
        type polaris_confdom_var_t;
    `)

    read_files_pattern($1, polaris_confdom_var_t, polaris_confdom_var_t)
`)
```

```
#####
## <summary>
##   Manage confd log file (i.e /var/confd0/log/cia-confd.log). Used
```

```

## by pman to rotate logs into /bootflash/tracelogs.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_conf_d_log_manage`,`
    gen_require(`
        type polaris_conf_d_var_t;
    `)
    manage_files_pattern($1, polaris_conf_d_var_t, polaris_conf_d_var_t)
`)

```

```
#####
```

```

## <summary>
## Execute dmi_ports_fetch in the caller domain.
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
#
interface(`confd_exec_dmi_ports_fetch`,`
    gen_require(`
        type polaris_dmi_ports_fetch_exec_t;
    `)

    corecmd_search_bin($1)
    can_exec($1, polaris_dmi_ports_fetch_exec_t)
`)

```

```
#####
```

```

## <summary>
##   Manage confd /var/log files (i.e /var/log/confd)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_conf_d_var_log_manage`,`
    gen_require(`
        type polaris_conf_d_var_log_t;
    `)

```

```
logging_log_filetrans($1, polaris_confd_var_log_t, dir, "confd")
manage_dirs_pattern($1, var_log_t, polaris_confd_var_log_t)
manage_files_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
')
```

```
#####
## <summary>
##   Read confd /var/log files (i.e /var/log/confd)
##   /bootflash/tracelogs/cia-netconf-trace* also has polaris_confd_var_log_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confd_var_log_read`,`
    gen_require(`
        type polaris_confd_var_log_t;
    `)
    list_dirs_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
    read_files_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
')
```

```
#####
## <summary>
## Write into fifo file created by confd, typical case when
##   confd starts script under popen in different domain.
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_confd_tmp_use_fifo`,`
    gen_require(`
        type polaris_confd_tmp_t;
    `)

    read_fifo_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
    write_fifo_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
')
```

```
#####
## <summary>
## Write into file created by confd, to deal with cases
```

```

##  confd starts script under popen in different domain and
##  file descriptor leaks into another domain. Since we cannot
##  modify confd to use O_CLOEXEC
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_confd_tmp_use`,`
gen_require(`
type polaris_confd_tmp_t;
`)

read_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
write_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
`)

#####
## <summary>
## Provide access for file operations under /etc/ dir.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_confd_etc_read`,`
gen_require(`
type polaris_confd_etc_t;
`)

read_files_pattern($1, polaris_confd_etc_t, polaris_confd_etc_t)
`)

#####
## <summary>
## Create an object in the /var directory under
## polaris_confd_var_t label.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>

```

```

## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_conf_d_var_filetrans`,`
    gen_require(`
        type polaris_conf_d_var_t;
    `)

    files_var_filetrans($1, polaris_conf_d_var_t, $2, $3)
)

#####
## <summary>
## Make the specified domain able to work with /var/confd0
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_var_dir_manage`,`
    gen_require(`
        type polaris_conf_d_var_t;
    `)

    manage_dirs_pattern($1, polaris_conf_d_var_t, polaris_conf_d_var_t);
)

#####
## <summary>
## Execute a domain transition to run admin_tech scripts of sdwan
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_admin_tech_domtrans`,`

```

```

gen_require(
    type polaris_admin_tech_t, polaris_admin_tech_exec_t;
)

domtrans_pattern($1, polaris_admin_tech_exec_t, polaris_admin_tech_t)
)

#####
## <summary>
##   Read admin_tech files created under bootflash
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_admin_tech_data_read`,
    gen_require(
        type polaris_admin_tech_data_t;
    )
    read_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
)

#####
## <summary>
##   Manage admin_tech files created under bootflash
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_admin_tech_data_manage`,
    gen_require(
        type polaris_admin_tech_data_t;
    )
    manage_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
    manage_lnk_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
    manage_dirs_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)

    allow $1 polaris_admin_tech_data_t:file watch;
)

#####
## <summary>
## Allow domain to be started by confd with

```

```

## transition into specific service domain.
## </summary>
## <param name="domain">
## <summary>
## Type to be used to run utility.
## </summary>
## </param>
## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
interface(`polaris_conf_d_domain`,`
gen_require(`
type polaris_conf_d_t;
`)

domtrans_pattern(polaris_conf_d_t, $2, $1)
`)

#####
## <summary>
## Manage confd_cli files under /tmp/confd_cli.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_cli_tmp_manage`,`
gen_require(`
type polaris_conf_d_cli_tmp_t;
`)
manage_files_pattern($1, polaris_conf_d_cli_tmp_t, polaris_conf_d_cli_tmp_t)
`)

#####
## <summary>
## Manage vconfd files under /tmp/vconfd.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_vconfd_tmp_manage`,`

```

```

gen_require(
    type polaris_vconfd_tmp_t;
)
manage_dirs_pattern($1, polaris_vconfd_tmp_t, polaris_vconfd_tmp_t)
manage_files_pattern($1, polaris_vconfd_tmp_t, polaris_vconfd_tmp_t)
)

```

```
#####
```

```

## <summary>
##   Connect to confd port. Should be used only by utility
## domains that do not have TDL entry. Processes with TDL entries
## just need to register as confd pseudo service clients.
## </summary>

```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_confid_connect`,`
    polaris_ripc_confid_ipc_connect($1)
)

```

```
#####
```

```

## <summary>
##   Use unix stream socket created by confd as standard I/O
## descriptors. Need to look more, because so far it triggers only
## getattr, append and ioctl permissions. If it would be real standard I/O
## it would need read and write as well.
## </summary>

```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_confid_unix_stream_stdio_use`,`
    gen_require(
        type polaris_confid_t;
    )
    allow $1 polaris_confid_t:unix_stream_socket { append getattr ioctl };
)

```

```
#####
```

```
## <summary>
```

```
## Creates types and rules for a script that is started
```

```
## by confd process.
```

```

## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_vconfd_domain_template`,`
    polaris_utility_domain_template($1)

    polaris_conf_doma_in(polaris_$1_t, polaris_$1_exec_t)

    # access /etc/passwd
    auth_use_nsswitch(polaris_$1_t)

    # inherit unix stream as script stdio
    polaris_conf_unix_stream_stdio_use(polaris_$1_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisconfd.if

No license file was found, but licenses were detected in source scan.

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl All rights reserved

dnl

divert(-1)

include(`polaris\_process.m4`)

include(`polaris\_database\_db.m4`)

include(`polaris\_database\_db\_fc.m4`)

include(`polaris\_max\_scope.m4`)

divert(0)dnl

#

# This is a generated file! Instead of modifying this file,

# modify proper platform TDL file.

#

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_fc.m4

No license file was found, but licenses were detected in source scan.

```

#
# February 2020, Victor Kamensky
#
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# All rights reserved
#

policy_module(polarisinstallmgr, 1.0);

gen_require(
    type polaris_install_mgr_t;
)
polaris_chasfs_manage(polaris_install_mgr_t)
polaris_tdlresolve_read(polaris_install_mgr_t)
polaris_cpld_read(polaris_install_mgr_t)
polaris_flashlib_read(polaris_install_mgr_t)
polaris_lua_read(polaris_install_mgr_t)

logging_send_syslog_msg(polaris_install_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_install_mgr_t)

polaris_db_tlddb_dir_use(polaris_install_mgr_t)

# read all files in persisten storage
polaris_persistent_read(polaris_install_mgr_t)

# calls code_verify
polaris_code_verify_domtrans(polaris_install_mgr_t)
# calls mount command
mount_domtrans(polaris_install_mgr_t)

# allow access to gnmib image files
optional_policy(
    polaris_gnmib_gnoi_images_read(polaris_install_mgr_t)
)

# LOOK AT ME: /dev/mem access restriction will be removed after
# CSCvu32649 is fixed using CSCvu32742.
# code_sign_verify accesses /dev/mem: class=chr_file, {read, open, map}
# to read the codesign key in storage
# side effects: execute is also allowed
gen_require(
    type polaris_code_verify_t;
    type polaris_nvram_file_t;
)
dev_rx_raw_memory(polaris_code_verify_t)

```

```

# read access to /bootflash/nvram_config on CLI "install remove inactivate"
read_files_pattern(polaris_code_verify_t, polaris_disk_bootflash_t, polaris_nvram_file_t)
getattr_files_pattern(polaris_code_verify_t, polaris_disk_bootflash_t, polaris_nvram_file_t)

# open, read, map and getattr access of capsule-upgrade.log file
polaris_capsule_upgrade_log_use(polaris_code_verify_t)

# calls install_mgr_helper_api.sh
corecmd_exec_bin(polaris_install_mgr_t)
corecmd_exec_shell(polaris_install_mgr_t)
auth_use_nsswitch(polaris_install_mgr_t)

# /tmp/sw/inst_tmp_x handling
type polaris_install_mgr_tmp_t;
files_tmp_file(polaris_install_mgr_tmp_t)
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_install_mgr_t, tmp_t, polaris_install_mgr_tmp_t)
manage_dirs_pattern(polaris_install_mgr_t, polaris_install_mgr_tmp_t, polaris_install_mgr_tmp_t)
files_tmp_filetrans(polaris_install_mgr_t, polaris_install_mgr_tmp_t, dir, "inst_tmp_1")
files_tmp_filetrans(polaris_install_mgr_t, polaris_install_mgr_tmp_t, dir, "inst_tmp_2")

# writes into /bootflash/.installer/watchlist
polaris_disk_install_manage(polaris_install_mgr_t)

# install_mgr_monitor.c:add_prior_watches
polaris_persistent_watch(polaris_install_mgr_t)

# watch over /tmp/patch
polaris_patch_data_watch(polaris_install_mgr_t)

polaris_repm_peer_mqipc_manage(polaris_install_mgr_t)

# watches over /tmp for /tmp/booted appearance in
# init_operation_mgmt_watches function
gen_require(
    type tmp_t;
)
allow polaris_install_mgr_t tmp_t:dir watch;

allow polaris_install_mgr_t self:capability sys_resource;

#install_mgr writes into /bootflash/.installer/watchlist and watches /bootflash/inot_fifo
polaris_install_disk_manage(polaris_install_mgr_t)

#install_mgr does search and get attribute operation on /tftp directory
gen_require(

```

```

    type tftpd_dir_rw_t;
)
allow polaris_install_mgr_t tftpd_dir_rw_t:dir { getattr search };

# allow read access to iso9660
fs_read_iso9660_files(polaris_install_mgr_t)

# accesses /proc/sys/vm/drop_caches
kernel_rw_vm_sysctls(polaris_install_mgr_t)

# creates files under /tmp/pkg_cs_debug through install_helper
# and verify_pkg shell function from common
polaris_pkg_cs_debug_manage(polaris_install_mgr_t)

# for pluggable FS, allow the install manager to access files on them (it needs read and
# write access).
gen_require(`
    type removable_t;
)
allow polaris_install_mgr_t removable_t:dir { getattr open read search watch };
allow polaris_install_mgr_t removable_t:file { getattr open read };
allow polaris_install_mgr_t removable_t:lnk_file read;

#allow install_mgr to stat caf files in /vol/harddisk/caf, /bootflash/caf, etc.
polaris_caf_tmp_files_read(polaris_install_mgr_t)

# install manager Cleanup related to inotify watches, Basically frees malloced memory
gen_require(`
    type root_t;
)
allow polaris_install_mgr_t root_t:dir watch;

# install manager access to /guestshell
polaris_guestshell_files_read(polaris_install_mgr_t)

# install manager access to /lib/systemd/systemd
polaris_init_access_check(polaris_install_mgr_t)

# install manager reads dcmlog.txt
optional_policy(`
    gen_require(`
        type polaris_fed_debug_dcmlog_t;
    )
    read_files_pattern(polaris_install_mgr_t, polaris_fed_debug_dcmlog_t, polaris_fed_debug_dcmlog_t)
)
# install manager reads /firmware
polaris_firmware_read(polaris_install_mgr_t)

```

```

# install manager reads /guestshell
gen_require(
    type polaris_guestshell_t;
)
getattr_dirs_pattern(polaris_install_mgr_t, polaris_guestshell_t, polaris_guestshell_t)

# install_manager reads /tmp/sw/boot during auto_upgrade
polaris_boot_tmp_read(polaris_install_mgr_t)

# install_manager writes /tmp/sw/boot during auto_upgrade
polaris_boot_tmp_write(polaris_install_mgr_t)

# install_manager reads /tmp/sw/boot/rmonbifo during auto_upgrade
polaris_rmonbifo_tmp_read(polaris_install_mgr_t)

# install_manager reads /tmp/tmppub during auto_upgrade
polaris_btrace_tmppub_read(polaris_install_mgr_t)

# install manager accesses /tmp/rsync_log_dir during auto_upgrade
polaris_manage_rsync_tmpllog_dir(polaris_install_mgr_t)

# install manager invokes mcp_chvrf.sh for rsync operations during auto_upgrade
polaris_chvrf_domtrans(polaris_install_mgr_t)

polaris_bexecute_domtrans(polaris_install_mgr_t)

#ifdef(^ngwc_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)
)

#ifdef(^mcp_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)
)

#ifdef(^wlc_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)

```

```

')

# with "/bootflash"...this needs read and attr to access for logfile
polaris_read_user_file(polaris_install_mgr_t)
polaris_user_file_getattr(polaris_install_mgr_t)

# auto upgrade server bind operation when install manager initialize auto upgrade server
corenet_tcp_bind_polaris_autoupgrade_port(polaris_install_mgr_t)

# access to /tmp/etc
polaris_etc_list(polaris_install_mgr_t)

# read access to /tmp/etc/installer
polaris_install_tmp_read(polaris_install_mgr_t)

polaris_script_errmsg_use(polaris_install_mgr_t)

# install mgr calls install_abort.sh on rollback timer expiry
polaris_install_engine_domtrans(polaris_install_mgr_t)

# /tmp/ufs/crashinfo access
optional_policy(`
polaris_ncd_tmp_read(polaris_install_mgr_t)
`)

# read/write to /bootflash/.rollback_timer/install_abort_time
polaris_rbtimer_bootflash_manage(polaris_install_mgr_t)

allow polaris_install_mgr_t self:process setpgid;

optional_policy(`
  polaris_efs_files_list_dirs(polaris_install_mgr_t)
`)

# walk all files on "install issu activate" and "install remove inactivate" CLI
files_read_all_files(polaris_install_mgr_t)

# install mgr file descriptor leaks into mcp_chvrf.sh for rsync operation
gen_require(`
  type polaris_chvrf_t;
`)
allow polaris_chvrf_t polaris_install_mgr_t:file read;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.te
No license file was found, but licenses were detected in source scan.

#

```

```

# May 2017, Victor Kamensky
#
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#

policy_module(polarisconfd, 1.0);

gen_require(
    type polaris_conf_d_t;
)

# confd-startup.sh calls confd_cmd to get_phase and other cases
# that utilities under confd label connects to confd
polaris_ripc_conf_d_ipc_connect(polaris_conf_d_t)

#confd needs communicate over HTTP
corenet_tcp_bind_http_port(polaris_conf_d_t)

# commplex_main (port 5000) is used by apache
corenet_udp_bind_commplex_main_port(polaris_conf_d_t)

corenet_tcp_bind_generic_node(polaris_conf_d_t)
allow polaris_conf_d_t self:tcp_socket { getattr getopt setopt bind create listen accept connect read write };

corenet_udp_bind_generic_node(polaris_conf_d_t)
allow polaris_conf_d_t self:udp_socket { bind connect create getattr getopt setopt };
corenet_udp_bind_polaris_conf_d_snmp_traps_port(polaris_conf_d_t)

logging_send_syslog_msg(polaris_conf_d_t)

polaris_chasfs_manage(polaris_conf_d_t)
polaris_btrace_data_manage(polaris_conf_d_t)
polaris_cpld_read(polaris_conf_d_t)
polaris_boot_tmp_read(polaris_conf_d_t)
polaris_rmonbifo_tmp_read(polaris_conf_d_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_conf_d_t)

# confd-startup.sh process is shell script need permission to execute shell
# and variety of small util commands under bin_t
corecmd_exec_shell(polaris_conf_d_t)
corecmd_exec_bin(polaris_conf_d_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_conf_d_t)

```

```

# confdexec needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_conf_d_t)

allow polaris_conf_d_t self:capability { net_admin sys_resource };

# allow read permissions for /etc/hosts file
sysnet_read_config(polaris_conf_d_t)

# allow read permissions for /var/run/netns/8
fs_read_nsfs_files(polaris_conf_d_t)

# work with /var/confd0/ files
type polaris_conf_d_var_t;
files_tmp_file(polaris_conf_d_var_t)
polaris_conf_d_var_filetrans(polaris_conf_d_t, dir, "confd0")
manage_files_pattern(polaris_conf_d_t, polaris_conf_d_var_t, polaris_conf_d_var_t)
manage_lnk_files_pattern(polaris_conf_d_t, polaris_conf_d_var_t, polaris_conf_d_var_t)
manage_dirs_pattern(polaris_conf_d_t, polaris_conf_d_var_t, polaris_conf_d_var_t)

# erlang calls efile_fileinfo function (./erts/emulator/drivers/unix/unix_efile.c)
# root directory. Inside of the function code calls 'access' function that check
# access permission for R_OK and W_OK. W_OK triggers denial warning. Insted of
# granting access let's mark it as dontaudit. Erlang will be fine with this
files_dontaudit_write_root_dirs(polaris_conf_d_t)

# deals with /dev/shm/confd files (shared memory and pid)
type polaris_conf_d_shm_t;
files_tmpfs_file(polaris_conf_d_shm_t)

# confd-startup.sh modifies confd.conf which is under polaris_conf_d_var_t label
# sed -i /CONFID_FXS_CISCO_AUTOGEN_EWLC/d /var/confd0/confd.conf
allow polaris_conf_d_t self:process setfscreate;

type polaris_conf_d_ndbutil_lock_t;
files_lock_file(polaris_conf_d_ndbutil_lock_t)

#####
# confd mmap_schema utility runs from systemd unit under polaris_conf_d_t label
#####
polaris_conf_d_shm_setup(polaris_conf_d_t)
# create ndbutil directory under /var/lock
polaris_conf_d_ndbutil_create(polaris_conf_d_t)

# Allow access to /crashinfo
polaris_disk_crashinfo_getattr(polaris_conf_d_t)

optional_policy^
# confd-startup.sh on nyquist makes ls /tmp/ufs/crashinfo

```

```

polaris_ncd_tmp_read(polaris_confd_t)
')

# confd-startup.sh reads /proc/cmdline
kernel_read_system_state(polaris_confd_t)

# LOOK AT ME allow mapping of low addresses, that could be exploited
# need to understand why; unfortunately confd symbols are not decodable
# need to ask tail-f guys
ifdef(`tsn_platform',`
domain_mmap_low_uncond(polaris_confd_t)
gen_require(`
    type polaris_confd_cli_t;
')
domain_mmap_low_uncond(polaris_confd_cli_t)
')
ifdef(`quake_platform',`
domain_mmap_low_uncond(polaris_confd_t)
')

polaris_mmap_schema_domtrans(polaris_confd_t)

# mmap_schema process policy
gen_require(`
    type polaris_mmap_schema_t;
')
polaris_btrace_data_manage(polaris_mmap_schema_t)
polaris_chasfs_read(polaris_mmap_schema_t)
polaris_cpld_read(polaris_mmap_schema_t)
polaris_flashlib_read(polaris_mmap_schema_t)

polaris_db_tlddb_dir_use(polaris_mmap_schema_t)

polaris_confd_ndbutil_create(polaris_mmap_schema_t)
polaris_confd_shm_setup(polaris_mmap_schema_t)

# connects to config mmap_schema is not TDL process, let
# grant explicit permission to access corresponding port
polaris_ripc_confd_ipc_connect(polaris_mmap_schema_t)
allow polaris_mmap_schema_t self:tcp_socket { connect create setopt };
polaris_socketat_nsfs_read(polaris_mmap_schema_t)

allow polaris_mmap_schema_t self:capability dac_override;

polaris_tdlresolve_read(polaris_mmap_schema_t)
polaris_confd_read(polaris_mmap_schema_t)

```

```

polaris_ndbmand_ndbutil_manage(polaris_mmap_schema_t)

optional_policy(
polaris_gnmib_ndbutil_lock(polaris_mmap_schema_t, ".l.schema_use.gnmib")
')

type polaris_confd_tmp_t;
files_tmp_file(polaris_confd_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_confd_tmp_t, dir, "confd")
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, dir, "confd")
manage_files_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)
manage_fifo_files_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)
manage_dirs_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)

# posix_pathconf called from get_tmpdir calls starvfs over /tmp
fs_getattr_tmpfs(polaris_confd_t)

# dmi_ports_fetch that runs under confd_t reads global.service.conf
polaris_tdlresolve_read(polaris_confd_t)
confd_exec_dmi_ports_fetch(polaris_confd_t)

# confd-startup script reads /tmp/dmi.ds_config if it exists
polaris_psd_tmp_read(polaris_confd_t)

# vip-confd-startup.sh related
# figure out BOOT_ROLE in install_util.sh
polaris_read_packages_conf(polaris_confd_t)
# touch /bootflash/sdwan/day0_oper.xml
allow polaris_confd_t self:capability dac_override;
polaris_bootflash_manage(polaris_confd_t)
# /usr/bin/sw syncddb call uuidgen
dev_read_rand(polaris_confd_t)

polaris_dmiauthd_tmp_manage(polaris_confd_t)

# PLEASE LOOK AT ME: overloaded use of /bootflash/.installer and
# /bootflash/.sdwaninstaller directories. In controller mode cedge code loopback
# mounts /bootflash/.sdwaninstallerfs file onto /bootflash/.sdwaninstaller and
# creates /bootflash/.installer symbolic link to it. As result effective
# /bootflash/.installer carries two meaning: used by polaris install infra for
# regular install operations, and keep persitent state in controller mode. For
# now /bootflash/.sdwaninstallerfs was forced to be mounted with
# polaris_disk_install_t label, so installer policy would be happy, but confd
# writes into it through /var/confd0 which is symbolic link to
# /bootflash/.installer/images/pkg_boot_17.3.01/confd0 that means we need to
# grant polaris_disk_install_manage to confd which is not good thing.
# It would be much better if two different directories would be used.
polaris_disk_install_manage(polaris_confd_t)

```

```

# /var/log/confd handling
type polaris_confd_var_log_t;
logging_log_file(polaris_confd_var_log_t)
polaris_confd_var_log_manage(polaris_confd_t)

# /etc/version handling
type polaris_confd_etc_t;
files_config_file(polaris_confd_etc_t)
files_etc_filetrans(polaris_confd_t, polaris_confd_etc_t, file, "version")
gen_require(
    type etc_t;
)
manage_files_pattern(polaris_confd_t, etc_t, polaris_confd_etc_t)

# "/usr/bin/sw syncddb" calls "confd_cmd -p 3010 -o -c "delete /software""
# that invokes /usr/binos/conf/install_assist.sh
polaris_install_engine_domtrans(polaris_confd_t)

# confd calls /usr/bin/sw that creates temp files in /tmp/cedge_sw_log
# since it runs under same domain make sure that cedge_sw_log gets
# right label
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, dir, "cedge_sw_log")

# /tmp/confd_booted created by vip-confd-start
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, file, "cedge_booted")

# runs flashutils to read rommon variables
polaris_flashlib_read(polaris_confd_t)

allow polaris_confd_t self:capability fowner;

optional_policy(
# work with /tmp/.econfd2sysmgr-ipc
polaris_econfd2sysmgr_tmp_manage(polaris_confd_t)
)

# confdexec calls dmidecode to get bios-vendor
dmidecode_domtrans(polaris_confd_t)

optional_policy(
# polaris_sw.sh called in confd context accesses
# /etc/viptela/controller_version
polaris_chedge_etc_manage(polaris_confd_t)
)

# PLEASE LOOK AT ME confd tcp ports are supposed to be handle
# through TDL pseudo services, that one it not

```

```

corenet_tcp_connect_polaris_conf_d_maapi_port(polaris_conf_d_t)

# confd starts cmdptywrapper utility through erl_child_setup
# that allocates free pty device using operations on /dev/ptms
allow polaris_conf_d_t self:capability { fsetid setgid };
term_getattr_pty_fs(polaris_conf_d_t)
term_setattr_generic_ptys(polaris_conf_d_t)
term_use_generic_ptys(polaris_conf_d_t)
term_use_ptmx(polaris_conf_d_t)

# uses nice utility to start misc scripts
allow polaris_conf_d_t self:process setsched;

# allow netconf_callhome to execute ncssh under ncssh domain
polaris_ncssh_mgmt_domtrans(polaris_conf_d_t)

# allow DmiAuth spawned by confd to access /tmp/.DmiAuth.socket
polaris_dmi_auth_dgram_send(polaris_conf_d_t)

# the default port for NETCONF Call Home (SSH) is 4334,
# and it is configurable by users
corenet_tcp_connect_all_ports(polaris_conf_d_t)
# by default the port is selected by system, and it is configurable by users
corenet_tcp_bind_generic_port(polaris_conf_d_t)
# netconf_callhome may create vrf-based netns on demand
polaris_vrf_netns_manage(polaris_conf_d_t)

# cmdwrapper utility that started by confd calls xstat
allow polaris_conf_d_t self:capability setuid;

# label for /tmp/vconfd temporary files created by binos/viptela/vconfd/*.sh
# scripts created from viptela/vconfd/vconfd_script_cli_session.sh
type polaris_vconfd_tmp_t;
files_tmp_file(polaris_vconfd_tmp_t)
# confd writes /tmp/vconfd/USID.XXX and /tmp/vconfd/THANDLE.YYY files
polaris_vconfd_tmp_manage(polaris_conf_d_t)

# label for /tmp/confd_cli temporary files created by execute_conf_d_cli.sh
type polaris_conf_d_cli_tmp_t;
files_tmp_file(polaris_conf_d_cli_tmp_t)

# execute_conf_d_cli creates /tmp/sh-thd moved to /tmp/confd_cli
files_tmp_filetrans({ polaris_conf_d_t polaris_conf_d_cli_t}, polaris_conf_d_cli_tmp_t, dir, "confd_cli")

# execute_conf_d_cli.sh script policy
polaris_utility_domain_template(conf_d_cli)
polaris_bexecute_domain(polaris_conf_d_cli_t, polaris_conf_d_cli_exec_t)

```

```

polaris_chasfs_read(polaris_confd_cli_t)
corecmd_exec_shell(polaris_confd_t)
corecmd_exec_bin(polaris_confd_cli_t)
auth_use_nsswitch(polaris_confd_cli_t)
# bash get_tmpdir statfs /tmp directory
fs_getattr_tmpfs(polaris_confd_cli_t)

polaris_confd_cli_tmp_manage(polaris_confd_cli_t)
polaris_vconfd_tmp_manage(polaris_confd_cli_t)
telnet_use_ptys(polaris_confd_cli_t)

polaris_rpc_confd_ipc_connect(polaris_confd_cli_t)

# execute_confd_cli.sh -a -g PRIV00 runs grep over /bootflash/sdwan/.init_stage
polaris_bootflash_read(polaris_confd_cli_t)

# execute_confd_cli.sh writes to "pipe:[24719894]"
polaris_dmi_ncsshd_fwd_use_fifo(polaris_confd_cli_t)
# allow /usr/binos/conf/bexecute.sh for tcp_socket access
# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /bin/mcp_pkg_wrap rp_daemons
# /usr/binos/conf/execute_co"
allow polaris_confd_cli_t polaris_dmi_ncsshd_fwd_t:tcp_socket ioctl;
#=====
# admin-tech : scripts in binos/viptela/vconfd/*admin_tech*.sh
# Invocation triggered here:
# viptela/vconfd/viptela-actions.yang: tailf:exec "vconfd_script_admin_tech.sh"
#=====
polaris_vconfd_domain_template(admin_tech)

# /bin/bash /usr/binos/conf/bshell.sh -S -c
# show platform hardware qfp active infrastructure shared-memory
# process cpp-control-pro.....
polaris_bexecute_domtrans(polaris_admin_tech_t)

# admin-tech launches "ps" via scripts
domain_read_all_domains_state(polaris_admin_tech_t)

# See tracelogs accessed by vconfd_script_polaris_admin_tech_child.sh
polaris_btrace_data_manage_all(polaris_admin_tech_t)

# various utilities like "find", "memaudit", etc needs this
files_getattr_all_files(polaris_admin_tech_t)
files_getattr_all_dirs(polaris_admin_tech_t)
fs_getattr_all_fs(polaris_admin_tech_t)
files_read_all_files(polaris_admin_tech_t)

# '/bin/bash /usr/bin/memaudit' needs access to /proc/kmsg, /proc/mdstat, etc

```

```

dev_getattr_mtrr_dev(polaris_admin_tech_t)
kernel_read_all_proc(polaris_admin_tech_t)
dev_getattr_loop_control(polaris_admin_tech_t)

# infra/memaudit/memaudit uses dmesg
dmesg_domtrans(polaris_admin_tech_t)
gen_require(
    type dmesg_t;
)
polaris_confid_unix_stream_stdio_use(dmesg_t)

# infra/memaudit/memaudit uses mount
mount_domtrans(polaris_admin_tech_t)

# infra/memaudit/memaudit uses fdisk
fstools_domtrans(polaris_admin_tech_t)
polaris_nvram_read(polaris_admin_tech_t)
polaris_nvram_getattr(polaris_admin_tech_t)

# infra/memaudit/memaudit writes to /proc/sys/vm/drop_caches
kernel_rw_vm_sysctls(polaris_admin_tech_t)

# memaudit and smap needs 'getattr', 'search' on sysctl_irq_t:dir
kernel_read_irq_sysctls(polaris_admin_tech_t)

# du -b -s /tmp/cc /tmp/rp /tmp/fp
files_getattr_all_sockets(polaris_admin_tech_t)
files_getattr_all_pipes(polaris_admin_tech_t)

# df -Th -BM needs access to /run/netns/2
fs_getattr_nsfs_files(polaris_admin_tech_t)

# ls /tmp/ufs/harddisk
# maapi --clicmd --get-io --no-hidden show configuration commit list
corecmd_exec_bin(polaris_admin_tech_t)

# bash vconfd_script_admin_tech.sh -u root -c cli executes:
# 1. map on /etc/passwd
auth_map_passwd(polaris_admin_tech_t)
# 2. hostname
hostname_exec(polaris_admin_tech_t)
# 3. journalctl
journalctl_domtrans(polaris_admin_tech_t)

# journalctl writes to /tmp/vm4-bootuplog-20200903-175223-UTC.log
# see vconfd_script_polaris_admin_tech_child.sh
gen_require(
    type journalctl_t;

```

```

')
manage_files_pattern(journalctl_t, polaris_admin_tech_tmp_t, polaris_admin_tech_tmp_t)
polaris_conf_unix_stream_stdio_use(journalctl_t)

# admin_tech reads /tmp/chassis/cpld/chasfs/board_vtype on crankshaft(sdwan)
polaris_chasfs_read(polaris_admin_tech_t)

# find -H /misc/scratch -name MEMORY_LOG_*.text
# memaudit writes to /bootflash/MEMORY_LOG_2020-07-28-01:32:11.text
# We also have 'mv -Z /bootflash/admintech /var/tech/ios'
# admin_tech watches /tmp/chassis/local/rp/chasfs/etc/ios_admintech_done
type polaris_admin_tech_data_t;
polaris_disk_type(polaris_admin_tech_data_t)
polaris_bootflash_filetrans(polaris_admin_tech_t, polaris_admin_tech_data_t, dir)
polaris_bootflash_filetrans(polaris_admin_tech_t, polaris_admin_tech_data_t, file)
polaris_admin_tech_data_manage(polaris_admin_tech_t)

# sdwan_tech_support.sh -o /var/tech/binos; work with /var/tech/ files
type polaris_admin_tech_var_t;
files_tmp_file(polaris_admin_tech_var_t)
files_var_filetrans(polaris_admin_tech_t, polaris_admin_tech_var_t, dir, "tech")
manage_files_pattern(polaris_admin_tech_t, polaris_admin_tech_var_t, polaris_admin_tech_var_t)
manage_dirs_pattern(polaris_admin_tech_t, polaris_admin_tech_var_t, polaris_admin_tech_var_t)

# vconfd_script_polaris_admin_tech.sh invokes vlog "Requested admin-tech initiated."
# vlog is implemented in viptela/utils/vlog using logger; that needs
# - ceate/connect unix_dgram_socket of type polaris_admin_tech_t
# - read from devtmpfs of type devlog_t
# - write to sock_file of type devlog_t
# - sendto path="/run/systemd/journal/dev-log" of type unix_dgram_socket
logging_send_syslog_msg(polaris_admin_tech_t)

# maapi --cliget paginate: this performs connect to confd socket
polaris_rpc_conf_ipc_connect(polaris_admin_tech_t)

# reads /tmp/chassis/cpld/chasfs/board_vtype
# on c8kv cpld is at /sys/bus/platform/devices/cpld which has sysfs_t LABEL
polaris_cpld_read(polaris_admin_tech_t)

# handle various files created under /tmp
type polaris_admin_tech_tmp_t;
files_tmp_file(polaris_admin_tech_tmp_t)
files_tmp_filetrans(polaris_admin_tech_t, polaris_admin_tech_tmp_t, file)
manage_files_pattern(polaris_admin_tech_t, polaris_admin_tech_tmp_t, polaris_admin_tech_tmp_t)

# As part of admin-tech generation on cEdges, vconfd_script_polaris_admin_tech.sh
# invokes vconfd_script_polaris_admin_tech_child.sh which in turn invokes the
# script sdwan_tech_support.sh. The sdwan_tech_support.sh passes the file

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```

# /tmp/sdwan_tech_support_command_file_out.txt to a bshell instance. The bshell
# instance does open operation on the file. So bshell needs open allow
# policy for /tmp/sdwan_tech_support_command_file_out.txt
gen_require(
    type polaris_bshell_t;
)
allow polaris_bshell_t polaris_admin_tech_tmp_t:file open;

# maapi needs this.
allow polaris_admin_tech_t self:tcp_socket { getopt setopt create connect read write };

# tar --ignore-failed-read -czf /home/vmanage-admin/vm4-20200903-055157-admin-tech.tar.gz
#   /tmp/fp/trace/cpp_cp_F0-0_TAN.20041_0.20
allow polaris_admin_tech_t self:capability dac_override;

# awk /^Shared/ {v += $2} END { print v} /proc/6384/smmaps
allow polaris_admin_tech_t self:capability sys_ptrace;

# 'top -n1 -b' creates /.config dir
# TODO/LOOKATME: selinux team to review handling of this issue in a
# common way for invoking top
allow polaris_admin_tech_t root_t:dir create;

# "show installerfs" is invoked by vconfd_script_admin_tech_common.sh
# this invokes vconfd_script_show_installerfs.sh via confd
# let's execute this under install_show domain
polaris_install_show_domtrans(polaris_conf_d_t)

# create_bootflash_snapshot() performs 'ls -l /bootflash/.installer'
polaris_disk_install_read(polaris_admin_tech_t)

# vconfd_script_polaris_admin_tech_child.sh
# mv /bootflash/admintech /var/tech/ios
allow polaris_admin_tech_t self:process setfscreate;

# rm -rf $collated_ra (collated_log_*)

#Nutella-XE - Vedge image install
#/bin/sh /tmp/sw/rp/0/0/rp_security/mount/bin/sw syncddb
#mount -t vfat /dev/mmcblk0gp0p1 /gpp
mount_domtrans(polaris_conf_d_t)

#df /bootflash
fstools_domtrans(polaris_conf_d_t)

#Nutella-XE - Vedge image activate
#/usr/bin/flashutil --command unsetvar --name MIG_INT_STATE
polaris_flashlib_write(polaris_conf_d_t)

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# permit comm="ps" to "getattr" on dev="devtmpfs" for polaris_admin_tech_t
term_getattr_unallocated_ttys(polaris_admin_tech_t)

# permit to access polaris_proc_rmonbifo_t by
# /usr/bin/vconfd_script_admin_tech.sh
polaris_proc_rmonbifo_read(polaris_admin_tech_t)

# permit to access/unlink /bootflash by polaris_admin_tech_t
polaris_bootflash_manage(polaris_admin_tech_t)

# vconfd_script_admin_tech.sh executes 'top -n1 -b' which creates /.config dir
gen_require(
    type admin_home_t;
)
allow polaris_admin_tech_t admin_home_t:dir { add_name create write };

# vconfd_script_admin_tech.sh sources vconfd_script_cli_session.sh and calls
# start_cli_session() which writes to /tmp/vconfd/USID.XXX,
# /tmp/vconfd/THANDLE.YYY and /tmp/vconfd/start_cli.XXXXXXXXXXX
polaris_vconfd_tmp_manage(polaris_admin_tech_t)

# work with "/tmp/fp/pvp/work/inot_fifo"
polaris_pvp_stdin_read(polaris_admin_tech_t)

# work with "/tmp/fp/trace/fifo/pvp_sh%fp_0_0_22607_fifo"
polaris_use_btrace_fifo(polaris_admin_tech_t)

# access to tunnel interface from snapshot_cdb()
corenet_rw_tun_tap_dev(polaris_confd_t)

# access to /tmp/bootstrap/sdwan/ciscosdwan_cloud_init.cfg
init_read_script_tmp_files(polaris_confd_t)

# "vconfd_notifier security-clear-installed-cert" reads
# /var/run/netns/default which is symlinked to /proc/1/ns/net
polaris_cedge_reset_ns(polaris_confd_t)

# allow /usr/binos/conf/execute_confd_cli.sh to access polaris_disk_install_t
polaris_disk_install_read(polaris_confd_cli_t)

# vconfd script ends up cleaning core files, most likely its
# vconfd_script_polaris_admin_tech_child.sh, so it needs read/write
# permission to polaris_core_file_t files.
polaris_core_file_manage(polaris_admin_tech_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisconfd.te

```

No license file was found, but licenses were detected in source scan.

```
#
# OWNERS - Code Ownership
#
# For information on the purpose and format of this file see:
# https://polaris-git.cisco.com/csg/polaris/wiki/Code-Reviews
#
# Copyright (c) 2019-2021 by Cisco Systems, Inc.
# All rights reserved.
#

* @csg/polaris-selinux-dev

#iox team related files
polariscontainer*    @csg/polaris-selinux-dev @csg/iox-selinux
polariscsf*         @csg/polaris-selinux-dev @csg/iox-selinux
polarisgsdrp*       @csg/polaris-selinux-dev @csg/iox-selinux
polarisioxman*      @csg/polaris-selinux-dev @csg/iox-selinux
polarisvman*        @csg/polaris-selinux-dev @csg/iox-selinux
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/OWNERS
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris lm Policy Rules.</summary>
```

```
#####
## <summary>
##   Read files of type polaris_lm_tmp_t (e.g., /tmp/iosd_level)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_lm_tmp_read`,
  gen_require(
    type polaris_lm_tmp_t;
  )
)
```

```
    read_files_pattern($1, polaris_lm_tmp_t, polaris_lm_tmp_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislm.if
```

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Shawn Lu
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris nmspd Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnmspd.if
```

No license file was found, but licenses were detected in source scan.

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
```

```
define(`polaris_database_aux',`dnl
```

```
#####
```

```
## <summary>
```

```
## Use $2 database.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <infoflow type="none"/>
```

```
#
```

```
interface(`polaris_db_tdlldb_$1_use',`
```

```
    gen_require(`
        type $2;
```

```
    `)
```

```
    polaris_tdlldb_use(dollarone, $2, $3)
```

```
    `)
```

```
    `)
```

```
define(`polaris_database',`dnl
```

```
polaris_database_aux(database_stem($1), database_label($1), $1)dnl
')
```

```
define(^polaris_database_process,`')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_db_if.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarishm, 1.0);
```

```
gen_require(^
    type polaris_hm_t;
')
```

```
polaris_btrace_data_manage(polaris_hm_t)
```

```
polaris_chasfs_manage(polaris_hm_t)
```

```
polaris_tdlresolve_read(polaris_hm_t)
```

```
polaris_tdlldb_list_dirs(polaris_hm_t)
```

```
polaris_cpld_read(polaris_hm_t)
```

```
polaris_lua_read(polaris_hm_t)
```

```
polaris_flashlib_read(polaris_hm_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_hm_t)
```

```
polaris_db_tdlldb_dir_use(polaris_hm_t)
```

```
files_getattr_all_files(polaris_hm_t)
```

```
files_getattr_all_dirs(polaris_hm_t)
```

```
gen_require(^
    attribute non_security_file_type;
```

```
')
```

```
allow polaris_hm_t { non_security_file_type } :dir list_dir_perms;
```

```
# hman need to read proc for all processes to collect CPU
```

```
# utilization information
```

```
domain_read_all_domains_state(polaris_hm_t)
```

```
domain_signull_all_domains(polaris_hm_t)
```

```
kernel_read_system_state(polaris_hm_t)
```

```

# hman needs to run "df /dev/shm" command
corecmd_exec_bin(polaris_hm_t)
corecmd_exec_shell(polaris_hm_t)

# hman needs to operate on all maroon files
polaris_maroon_data_manage_all(polaris_hm_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_hm_t)

fs_getattr_tmpfs(polaris_hm_t)

# work with /tmp files (/tmp/myhostname)
type polaris_hm_tmp_t;
files_tmp_file(polaris_hm_tmp_t)
manage_files_pattern(polaris_hm_t, tmp_t, polaris_hm_tmp_t)
files_tmp_filetrans(polaris_hm_t, polaris_hm_tmp_t, file, "myhostname")

allow polaris_hm_t self:capability { chown fsetid dac_override kill sys_resource sys_ptrace };
allow polaris_hm_t self:process setsched;
allow polaris_hm_t self:unix_dgram_socket create;
allow polaris_hm_t self:cap_userns { kill sys_ptrace };

polaris_boot_tmp_read(polaris_hm_t)

# Allow write to flash. Needed for usb disable feature
ifdef(`ngwc_family',`
polaris_flashlib_write(polaris_hm_t)
')

# "show platform software mount RP active" command needs attributes of
# all file systems
fs_getattr_all_fs(polaris_hm_t)
# above show command accesses /var/run/netns/2
fs_read_nsfs_files(polaris_hm_t)
# reads /scratch link which is labeled as polaris_disk_bootflash_t
polaris_disk_bootflash_read_lnk(polaris_hm_t)
polaris_disk_harddisk_read_lnk(polaris_hm_t)

# needed for "show platform software bound-uds RP active"
kernel_read_network_state(polaris_hm_t)

# "show rom-monitor R0" needs content of /proc/rmonbifo/bootver;
# please refer to hman_ui.tpp file
polaris_proc_rmonbifo_read(polaris_hm_t)

# "show plat soft yang-management process r0" invokes hm_show_yang_proc_cb;
# "show plat soft iox-service" invokes hm_iox_srvc_show_cb;

```

```

# They invoke "ps -C" which needs access to /sys/devices/system/cpu/online
# TODO: should we replace system() with something like hm_get_procs_with_name_running
dev_read_sysfs(polaris_hm_t)
# "show platform software yang-management process state" invokes /bin/mcp_pkg_wrap,
# which sources /tmp/sw/boot/rmonbifo/env_var.sh
polaris_rmonbifo_tmp_read(polaris_hm_t)
# show iox-service requires reading of libvirt_ver of created under CAF context
optional_policy(
polaris_caf_tmp_files_read(polaris_hm_t)
)
# hardcoded policy for hm to df, per Victor
optional_policy(
    gen_require(
        type polaris_iosd_portal_dmi_lipc_t;
        type polaris_iosd_portal_app_lipc_t;
    )
    allow polaris_hm_t { polaris_iosd_portal_dmi_lipc_t polaris_iosd_portal_app_lipc_t }:sock_file getattr;
)

# during "show version installed" command
# "grep -q srdriver /tmp/sw/rp/local/0/rp_base/iso" which is link to the universal image
polaris_bootflash_read(polaris_hm_t)
# this is for calcsha.sh (invoked by the command above) but might work for others too
polaris_install_engine_domtrans(polaris_hm_t)
# this if for hman to read and delete /tmp/version.info created by calcsha.sh in prev context type
polaris_install_tmp_read(polaris_hm_t)
gen_require(
    type polaris_install_tmp_t;
)
allow polaris_hm_t polaris_install_tmp_t:file unlink;

# need open, read on /bootflash/packages.conf (grep sha1sum: /tmp/packages.conf)
polaris_read_packages_conf(polaris_hm_t)

# This is created for hman to grant it access to /bootflash/topnmemuse
polaris_bootflash_manage(polaris_hm_t)

# read /tmp/pkg_summary.txt file
polaris_pkg_summary_tmp_read(polaris_hm_t)

polaris_zram_getattr(polaris_hm_t)

optional_policy(
polaris_ssd_auth_domtrans(polaris_hm_t)
)

optional_policy(
polaris_ssd_unmount_domtrans(polaris_hm_t)
)

```

```

)

optional_policy(
polaris_confdomtrans(polaris_hm_t)
)

#####
# show platform software process slot R0 monitor
# mcp_monitor_process_batchmode.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_monitor_process_batchmode.sh -n 1 -d 3 -l 0
#####

polaris_utility_domain_template(monitor_process)

polaris_bexecute_domtrans(polaris_hm_t)
polaris_bexecute_domain(polaris_monitor_process_t, polaris_monitor_process_exec_t)

# mcp_monitor_process_batchmode.sh calls "top" command
# "top" needs read/getattr access of various files in the system
domain_read_all_domains_state(polaris_monitor_process_t)

# "top" needs access to /sys/devices/system/cpu/online, etc
dev_read_sysfs(polaris_monitor_process_t)

# "top" need read access to /proc/meminfo, /proc/stat
kernel_read_system_state(polaris_monitor_process_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_monitor_process_t)

# need write/ioctl/getattr access for pipes like "pipe:[118396]"
polaris_hman_use_fifo(polaris_monitor_process_t)

corecmd_exec_bin(polaris_monitor_process_t)

gen_require(
    type admin_home_t;
)
#top -b -n3 -d3 needs permission to create dir /.config ,write
#to files and add files
allow polaris_monitor_process_t admin_home_t:dir { add_name create write };
allow polaris_monitor_process_t self:capability sys_ptrace;
#####

#####
# pkg_summary.sh : show version R0 installed
# /bin/bash /usr/binos/conf/pkg_summary.sh -o /tmp/pkg_summary.txt -d model -P
#####

```

```

polaris_utility_domain_template(pkg_summary)

polaris_pkg_summary_domtrans(polaris_hm_t)

# it executes find /tmp/sw -maxdepth 5 -mindepth 5 -name mount
files_getattr_all_dirs(polaris_pkg_summary_t)
files_getattr_all_files(polaris_pkg_summary_t)
files_read_all_dirs_except(polaris_pkg_summary_t)

polaris_chasfs_read(polaris_pkg_summary_t)
polaris_cpld_read(polaris_pkg_summary_t)
polaris_use_btrace_fifo(polaris_pkg_summary_t)
polaris_rmonbifo_tmp_read(polaris_pkg_summary_t)
polaris_btrace_data_manage(polaris_pkg_summary_t)
polaris_boot_tmp_read(polaris_pkg_summary_t)

# need open, read on /bootflash/debug.conf
polaris_read_debug_conf(polaris_pkg_summary_t)

polaris_read_packages_conf(polaris_pkg_summary_t)

allow polaris_pkg_summary_t self:capability sys_resource;

corecmd_exec_bin(polaris_pkg_summary_t)

auth_use_nsswitch(polaris_pkg_summary_t)

polaris_disk_crashinfo_getattr(polaris_pkg_summary_t)

# read /proc/cmdline
kernel_read_system_state(polaris_pkg_summary_t)

# handle /tmp/pkg_summary.txt file
type polaris_pkg_summary_tmp_t;
files_tmp_file(polaris_pkg_summary_tmp_t)
files_tmp_filetrans(polaris_pkg_summary_t, polaris_pkg_summary_tmp_t, file)
manage_files_pattern(polaris_pkg_summary_t, polaris_pkg_summary_tmp_t, polaris_pkg_summary_tmp_t)

#####

#####

# pkg_to_tree.sh : Generates a software tree based on a provisioning file.
# /bin/bash /usr/binos/conf/pkg_to_tree.sh -c /tmp/packages.conf
# -t /tmp/show_patch_provision_temp -p /tmp/sw/isos
# -r /tmp/show_provision_temp -a -q
#####

```

```

polaris_utility_domain_template(pkg_to_tree)

gen_require(
    type unconfined_service_t;
)
polaris_pkg_to_tree_domtrans({unconfined_service_t polaris_hm_t})

files_getattr_all_files(polaris_pkg_to_tree_t)
polaris_harddisk_read(polaris_pkg_to_tree_t)
polaris_cpld_read(polaris_pkg_to_tree_t)
polaris_use_btrace_fifo(polaris_pkg_to_tree_t)
polaris_rmonbifo_tmp_read(polaris_pkg_to_tree_t)
polaris_btrace_data_manage(polaris_pkg_to_tree_t)
polaris_boot_tmp_read(polaris_pkg_to_tree_t)
polaris_patch_data_manage(polaris_pkg_to_tree_t)

# if being executed on other node, telnet /dev/ptsN might be used
# as stdin/stdout
telnet_use_ptys(polaris_pkg_to_tree_t)

# pkg_to_tree.sh creates/deletes directories and files under
# /tmp/show_provision_temp
type polaris_show_provision_tmp_t;
files_tmp_file(polaris_show_provision_tmp_t)
polaris_show_provision_temp_manage(polaris_pkg_to_tree_t)

# pkg_to_tree.sh verifies each package as it is mounted
polaris_code_verify_domtrans(polaris_pkg_to_tree_t)

corecmd_exec_bin(polaris_pkg_to_tree_t)

polaris_disk_crashinfo_getattr(polaris_pkg_to_tree_t)

# manage the /tmp/lf symbolic link
type polaris_pkg_to_tree_tmp_t;
files_tmp_file(polaris_pkg_to_tree_tmp_t)
files_tmp_filetrans(polaris_pkg_to_tree_t, polaris_pkg_to_tree_tmp_t, lnk_file, "lf")
manage_lnk_files_pattern(polaris_pkg_to_tree_t, polaris_pkg_to_tree_tmp_t, polaris_pkg_to_tree_tmp_t)

# permit pkg_to_tree.sh mounting to use conf/pkg files in bootflash
polaris_bootflash_read(polaris_pkg_to_tree_t)
polaris_disk_bootflash_search(polaris_pkg_to_tree_t)

# we want to read the existing mounts in chasfs
polaris_chasfs_read(polaris_pkg_to_tree_t)

# pkg_to_tree.sh interfaces with installer data, including ISSU files
polaris_install_tmp_log_write(polaris_pkg_to_tree_t)

```

```

polaris_sw_data_manage(polaris_pkg_to_tree_t)
polaris_read_packages_conf(polaris_pkg_to_tree_t)
polaris_issu_tmp_files_manage(polaris_pkg_to_tree_t)
polaris_install_tmp_manage(polaris_pkg_to_tree_t)

# allow pkg_to_tree.sh to do the loopback mounts of packages and manage
# mount links in tmp. This includes mapping mounted passwd file and
# mounting sysfs. This is also needed to mount /mnt/sd3/iox_alt_hdd.dsk
mount_domtrans(polaris_pkg_to_tree_t)
auth_map_passwd(polaris_pkg_to_tree_t)
dev_list_sysfs(polaris_pkg_to_tree_t)
allow polaris_pkg_to_tree_t sysfs_t:file { getattr open read };
allow polaris_pkg_to_tree_t tmp_t:lnk_file { create rename unlink };

# when expanding/installing super images, pkg_to_tree uses install_engine_exec_t
# utilities like issu_check
polaris_install_engine_domtrans(polaris_pkg_to_tree_t)

#####
# misc hman cli(s)
#####

# hman needs access to /bootflash/.issu_loc_lock
polaris_issu_files_manage(polaris_hm_t)

# hman process creates/deletes directories and files under
# /tmp/show_provision_temp
polaris_show_provision_temp_manage(polaris_hm_t)

# signal send during show platform software process slot R0 monitor
polaris_send_signal_to_bexecute(polaris_hm_t)

polaris_dyncfg_tmp_read(polaris_hm_t)

polaris_disk_crashinfo_getattr(polaris_hm_t)

# setting up /dev/ttyS0 speed from hman_handle_console_baud_rate_change
term_use_unallocated_ttys(polaris_hm_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_hm_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_hm_t)

# hman starts agetty-iosd.service in case of nyquist stack
getty_systemctl(polaris_hm_t)

```

```

# This block is policies for "sh pla so filesystem bootflash: de" CLI
polaris_utility_domain_template(cli_fs_cmds)

gen_require(
    type polaris_bexecute_t;
)
polaris_bexecute_domtrans(polaris_cli_fs_cmds_t)
polaris_cli_fs_cmds_domtrans(polaris_bexecute_t)
telnet_use_ptys(polaris_cli_fs_cmds_t)

# Blanket permission for disk management for cli_fs_cmds (for show/erase fs)
polaris_persistent_manage(polaris_cli_fs_cmds_t)
# permission to manage removable ( seems pretty safe )
polaris_removable_manage(polaris_cli_fs_cmds_t)
polaris_getattr_removable(polaris_cli_fs_cmds_t)
fs_read_removable_symlinks(polaris_cli_fs_cmds_t)
# btrace.sh needs these
polaris_boot_tmp_read(polaris_cli_fs_cmds_t)
polaris_btrace_tmppub_read(polaris_cli_fs_cmds_t)
# this is for NFS access mounted in a dir of ncd context
optional_policy(
    polaris_ncd_tmp_read(polaris_cli_fs_cmds_t)
)

#need to access pipes like pipe:[107820]
polaris_hman_use_fifo(polaris_cli_fs_cmds_t)

# df or stat the mount point
fs_getattr_nfs(polaris_cli_fs_cmds_t)
# mkfs permissions via domtrans
fstools_domtrans(polaris_cli_fs_cmds_t)
# runs NFS exportfs ( copied from ncd )
rpc_read_exports(polaris_cli_fs_cmds_t)
rpc_write_exports(polaris_cli_fs_cmds_t)
rpc_manage_nfs_state_data_dir(polaris_cli_fs_cmds_t)
rpc_manage_nfs_state_data(polaris_cli_fs_cmds_t)
fs_rw_nfsd_fs(polaris_cli_fs_cmds_t)
kernel_rw_rpc_sysctls(polaris_cli_fs_cmds_t)
fs_getattr_xattr_fs(polaris_cli_fs_cmds_t)
# rsync/remote_format perms ( rsync borrowed from polariscrft.te )
polaris_udev_tmp_list_dirs(polaris_cli_fs_cmds_t)
gen_require(
    type rsync_exec_t;
    type rsync_port_t;
    type rsync_tmp_t;
)
allow polaris_cli_fs_cmds_t rsync_port_t:tcp_socket name_connect;
allow polaris_cli_fs_cmds_t rsync_exec_t:file { execute execute_no_trans getattr map open read };

```

```

allow polaris_cli_fs_cmds_t rsync_tmp_t:file open;

allow polaris_cli_fs_cmds_t self:capability { chown fsetid setgid };

# Need to access /proc/self/fd/1 by platform_fs_operation.sh which is invoked by
# /bin/bash/usr/binos/conf/mcp_cli_fs_cmds.sh show bootflash:all
fs_associate_proc(polaris_cli_fs_cmds_t)

polaris_cli_fs_cmds_domtrans(polaris_hm_t)

corecmd_exec_bin(polaris_cli_fs_cmds_t)
polaris_cpld_read(polaris_cli_fs_cmds_t)
polaris_chasfs_manage(polaris_cli_fs_cmds_t)
polaris_use_btrace_fifo(polaris_cli_fs_cmds_t)
polaris_rmonbifo_tmp_read(polaris_cli_fs_cmds_t)

auth_use_nsswitch(polaris_cli_fs_cmds_t)

# allow polaris_cli_fs_cmds_t polaris_udev_tmp_files_t:file open;
polaris_udev_tmp_read(polaris_cli_fs_cmds_t)
#watch on modify /tmp/udev/etc/udev/usbflash1-2/udev-info for remote/stby usb device
polaris_udev_tmp_watch(polaris_cli_fs_cmds_t)

# allow to run mount in its own domain
mount_domtrans(polaris_cli_fs_cmds_t)
# runs systemctl to remount file system.
# usb[01] fs_target remount service used.
systemd_exec_systemctl(polaris_cli_fs_cmds_t)
systemd_config_generic_services(polaris_cli_fs_cmds_t)

# allow to run readlink -f /dev/bootflash1
storage_getattr_fixed_disk_dev(polaris_cli_fs_cmds_t)

# allow "format" CLI to add/delete links in /dev/, and /; e.g., /dev/harddisk1 /harddisk
ifdef(`crankshaft_family',`
    gen_require(`
        type device_t;
        type root_t;
        type udev_t;
    `)
    #/dev/harddisk1 /dev/harddisk1 -> /dev/dm-0
    filetrans_pattern({udev_t polaris_cli_fs_cmds_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
    filetrans_pattern({udev_t polaris_cli_fs_cmds_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk")
    #/harddisk -> /misc/scratch
    filetrans_pattern(polaris_cli_fs_cmds_t, root_t, polaris_disk_bootflash_t, lnk_file, "harddisk")

    manage_lnk_files_pattern(polaris_cli_fs_cmds_t, fixed_disk_device_t, fixed_disk_device_t)

```

```

)
seutil_domtrans_setfiles(polaris_cli_fs_cmds_t)
polaris_hman_use_fifo(setfiles_t)
# need open, read on /bootflash/packages.conf
polaris_read_packages_conf(polaris_cli_fs_cmds_t)

# "sed" needs access to /proc/cmdline
kernel_read_system_state(polaris_cli_fs_cmds_t)

# work with /tmp files (/tmp/fs_lock_bootflash)
type polaris_cli_fs_cmds_tmp_t;
gen_require(
    type tmp_t;
)
files_tmp_file(polaris_cli_fs_cmds_tmp_t)
manage_files_pattern(polaris_cli_fs_cmds_t, tmp_t, polaris_cli_fs_cmds_tmp_t)
files_tmp_filetrans(polaris_cli_fs_cmds_t, polaris_cli_fs_cmds_tmp_t, file)

#"find /vol/disk0/caf" when show CLI is excuted
polaris_caf_tmp_files_read(polaris_cli_fs_cmds_t)

#Caf and IOxMan-CLI interaction
polaris_caf_tmp_files_manage(polaris_cli_fs_cmds_t)

# mcp_cli_fs_cmds.sh show webui: all runs df -P /webui
fs_getattr_tmpfs(polaris_cli_fs_cmds_t)

polaris_persistent_getattr(polaris_cli_fs_cmds_t)
fs_getattr_xattr_fs(polaris_cli_fs_cmds_t)
allow polaris_cli_fs_cmds_t self:capability dac_override;
allow polaris_cli_fs_cmds_t self:dir { add_name write };

# allow caf access to mcp_cli_fs_cmds.sh for fsck on ngwc platforms
ifdef(^ngwc_family',`
domain_read_all_domains_state(polaris_cli_fs_cmds_t)
polaris_caf_domtrans(polaris_cli_fs_cmds_t)
polaris_caf_files_read(polaris_cli_fs_cmds_t)
dev_read_sysfs(polaris_cli_fs_cmds_t)
)

#####
# fsck CLI using mcp_cli_fs_cmds.sh as tested on sparrow
#####
# allow fsck in mcp_cli_fs_cmds.sh to execute udev in the udev domain
udev_domtrans(polaris_cli_fs_cmds_t)
# allow crypsetup to be executed
lvm_domtrans(polaris_cli_fs_cmds_t)
# allow fsck to run on bootflash

```

```

polaris_nvram_getattr(polaris_cli_fs_cmds_t)

# during SDWAN admin-tech generation, fs_display_*(*) in mcp_cli_fs_cmds.sh is
# invoked; this tries to find files like /bootflash/tracelogs/cia-netcon* with
# LABEL polaris_conf_d_var_log_t
polaris_conf_d_var_log_read(polaris_cli_fs_cmds_t)
#####
# hm calls df to figure out tmpfs size, on some platforms
# where configfs is mounted it needs statfs access to it
gen_require(
    type configfs_t;
)
allow polaris_hm_t configfs_t:dir getattr;

# hm populates vrf_shm on behalf of iosd, and may create
# and delete vrf-based netns
polaris_vrf_netns_manage(polaris_hm_t)
fs_unmount_nsf(polaris_hm_t)

#read udev_info
polaris_udev_tmp_read(polaris_hm_t)

gen_require(
    type rsysync_t;
)
allow rsysync_t polaris_hm_t:fifo_file read;

#####
# show platform software yang-management process monitor
# mcp_monitor_dmi_proc.sh
# /bin/bash /bin/mcp_pkg_wrap rp_daemons /usr/binos/conf/mcp_monitor_dmi_proc.sh
#####

polaris_utility_domain_template(monitor_dmi_process)

polaris_bexecute_domain(polaris_monitor_dmi_process_t, polaris_monitor_dmi_process_exec_t)

# mcp_monitor_dmi_proc.sh calls "ps" command
# "ps" needs read/getattr access of various files in the system
# ps -eo comm,pid,s,vsize,rssize,%cpu,%mem,etime --sort=comm
domain_read_all_domains_state(polaris_monitor_dmi_process_t)

# "ps" needs access to /proc/uptime
kernel_read_system_state(polaris_monitor_dmi_process_t)

# "ps" needs access to /sys/devices/system/cpu/online, etc
dev_read_sysfs(polaris_monitor_dmi_process_t)

```

```

# "ps" need read access to /proc
kernel_list_proc(polaris_monitor_dmi_process_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_monitor_dmi_process_t)

# executes head command
corecmd_exec_bin(polaris_monitor_dmi_process_t)

# sources cyan_api.sh
files_exec_usr_files(polaris_monitor_dmi_process_t)

# /bin/bash /tmp/sw/rp/0/0/rp_daemons/mount/usr/binos/conf/mcp_monitor_dmi_proc.sh
corecmd_shell_entry_type(polaris_monitor_dmi_process_t)

# need write/ioctl/getattr access for pipes like "pipe:[79843]"
polaris_hman_use_fifo(polaris_monitor_dmi_process_t)

# read /etc/init.d/quad_sup_usb_infra.sh
init_read_script_files(polaris_cli_fs_cmds_t)
#This triggers access to /tmp/.flashlock and /dev/sda3
polaris_flashlib_lock(polaris_cli_fs_cmds_t)
#allow flash utility
polaris_flashlib_read(polaris_cli_fs_cmds_t)
# /sys/bus/usb/drivers/usb/*/authorized is accessed (read and write) from hman.
# For USB disable feature across all ngwc platforms needs authorized file to
# be accessed.
#ifdef(^ngwc_family',`
gen_require(^
type sysfs_t;
)
allow polaris_hm_t sysfs_t:file create;
dev_rw_sysfs(polaris_hm_t)
dev_manage_sysfs_dirs(polaris_hm_t)
)

# work with /tmp files (/tmp/usb-disable)
polaris_iosd_usb_disable_tmp_manage(polaris_hm_t)

#need access to tmp files created under issu directory
polaris_issu_tmp_files_read(polaris_hm_t)

# HMMAN calls for checking database compactability
# tdlldb_epoch_test is requires access to /tmp/issu/provision/sw-running.txt
polaris_install_tmp_read(polaris_hm_t)

optional_policy(^
polaris_efi_files_list_dirs(polaris_cli_fs_cmds_t)

```

')

```
# Execute hdparam in its own domain
fstools_domtrans(polaris_hm_t)
```

```
# Allow polaris_hm to get attributes of fixed disk
storage_getattr_fixed_disk_dev(polaris_hm_t)
```

```
# Allow read to ssd auth tmp files /tmp/ssd_blk_device
polaris_read_ssd_tmp_files(polaris_hm_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarishm.te
No license file was found, but licenses were detected in source scan.
```

```
#
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#
```

```
## <summary>Polaris ngwc_tbl_mgr Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.if
No license file was found, but licenses were detected in source scan.
```

```
#
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#
```

```
## <summary>Polaris polarisbtman Policy Rules.</summary>
```

```
#####
```

```
## <summary>
## Execute fs tools in the btrace_rotate domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
```

```
#
interface(`polaris_btrace_rotate_domtrans`,`
```

```

gen_require(
    type polaris_btman_t, polaris_btman_exec_t;
)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_btman_exec_t, polaris_btman_t)
)

#####
## <summary>
##   Read /tmp/tmpub files/dirs
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_btrace_tmppub_read`,
    gen_require(
        type polaris_btrace_tmppub_t;
    )

    read_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    read_lnk_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    list_dirs_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
)

#####
## <summary>
##   Manage /tmp/tmpub files/dirs
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_btrace_tmppub_manage`,
    gen_require(
        type polaris_btrace_tmppub_t;
    )

    manage_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    manage_dirs_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
)

#####

```

```

## <summary>
## Read and write all btman's fifo file, used as
##   standard input/output.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_btman_fifo`,`
gen_require(`
type polaris_btman_t;
`)

allow $1 polaris_btman_t:fifo_file { rw_term_perms lock append create unlink };
)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtman.if
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```

```

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#

```

```
## <summary>Polaris webui Policy Rules.</summary>
```

```
#####
```

```

## <summary>
##   Read files under /webui/..., these are webui odm file
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_webui_files`,`
gen_require(`
type polaris_webui_file_t;
`)

read_files_pattern($1, polaris_webui_file_t , polaris_webui_file_t)

```

```
read_inlk_files_pattern($1, polaris_webui_file_t, polaris_webui_file_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswebui.if
```

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```
#
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#
```

```
/tmp/fp/tlddb(/.*)?      gen_context(system_u:object_r:polaris_tlddb_t,s0)
/tmp/rp/tlddb(/.*)?      gen_context(system_u:object_r:polaris_tlddb_t,s0)
/tmp/cc/tlddb(/.*)?      gen_context(system_u:object_r:polaris_tlddb_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristlddb.fc
```

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```
#
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#
```

```
## <summary>Polaris NVRAM Policy Rules.</summary>
```

```
#####
```

```
# Polaris lsmpi
```

```
#####
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/lsmpi device.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <rolebase/>
```

```
#
```

```
interface(`polaris_lsmpi_dev_use',`
```

```
gen_require(`
```

```

        type device_t;
    type polaris_lsmpi_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_lsmpi_device_t)
    read_chr_files_pattern($1, device_t, polaris_lsmpi_device_t)
    allow $1 polaris_lsmpi_device_t:chr_file map;
)

#####
## <summary>
##   Read lsmpi sysctl file, ie one under /proc/sys/lsmpi and
## /proc/sys/lsmpi_lodrv directories.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lsmpi_sysctl_read`,`
gen_require(`
    type polaris_sysctl_lsmpi_t;
)
    read_files_pattern($1, polaris_sysctl_lsmpi_t, polaris_sysctl_lsmpi_t)
)

#####
## <summary>
##   Read from /sys/devices/virtual/contdev sysfs files.
## sys files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_contdev_dev_read`,`
gen_require(`
    type polaris_sysfs_contdev_t;
    type sysfs_t;
)
    read_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    list_dirs_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links

```

```

    allow $1 sysfs_t:lnk_file read;
)

#####
## <summary>
##   Write into /sys/devices/virtual/contdev sysfs files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_contdev_dev_write`,`
gen_require(`
type polaris_sysfs_contdev_t;
type sysfs_t;
)
write_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
# genfscon statement specifically excludes symbolic links from
# genfscon path specific entries. To workaround, let us allow
# to follow sysfs_t symbolic links
allow $1 sysfs_t:lnk_file read;
)

#####
## <summary>
##   Manage /sys/devices/virtual/contdev sysfs files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_manage_contdev_dev`,`
gen_require(`
type polaris_sysfs_contdev_t;
type sysfs_t;
)
manage_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
manage_dirs_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
# genfscon statement specifically excludes symbolic links from
# genfscon path specific entries. To workaround, let us allow
# to follow sysfs_t symbolic links
allow $1 sysfs_t:lnk_file read;
)
#####

```

```

## <summary>
##   Allow the specified domain to manage punt/inject socket
## files. I.e /tmp/pi/dp_2_iosd_pi and /tmp/pi/iosd_2_dp_pi
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pi_uds_manage',`
    gen_require(`
        type polaris_pi_uds_t;
    `)

    manage_sock_files_pattern($1, polaris_pi_uds_t, polaris_pi_uds_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisismpi.if
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```

```

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#

```

```

/usr/binos/conf/issu_stack.sh -- gen_context(system_u:object_r:polaris_issu_stack_exec_t,s0)

```

```

/tmp/issu_stk(/.*)?    gen_context(system_u:object_r:polaris_issu_stack_tmp_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissustack.fc
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```

```

#
# August 2017, Shawn Lu
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#

```

```

# polarisnmspd file contexts place holder

```

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#

# Aug 2020, Sridhar C

#

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#

policy\_module(polarisxcopy, 1.0);

#####

## xcopy\_script.sh

#####

polaris\_utility\_domain\_template(xcopy\_script)

polaris\_bexecute\_domain(polaris\_xcopy\_script\_t, polaris\_xcopy\_script\_exec\_t)

# xcopy\_script.sh call other scripts through brelay.sh

polaris\_bexecute\_domtrans(polaris\_xcopy\_script\_t)

polaris\_chasfs\_manage(polaris\_xcopy\_script\_t)

# xcopy calls curl/sshpass/scp command and support scp/http/https

gen\_require(`

type polaris\_curl\_t;

type ssh\_exec\_t;

type ssh\_home\_t;

type devpts\_t;

')

polaris\_curl\_domtrans(polaris\_xcopy\_script\_t)

corenet\_tcp\_connect\_ssh\_port(polaris\_curl\_t)

corenet\_tcp\_connect\_http\_port(polaris\_curl\_t)

corenet\_tcp\_connect\_ssh\_port(polaris\_xcopy\_script\_t)

# allow read of /etc/passwd

auth\_use\_nsswitch(polaris\_xcopy\_script\_t)

# read polaris vrf net namespace file

fs\_read\_nsfs\_files(polaris\_xcopy\_script\_t)

# curl needs access to bootflash

polaris\_bootflash\_manage(polaris\_curl\_t)

polaris\_bootflash\_manage(polaris\_xcopy\_script\_t)

# also need to be able to ls /tmp/ufs/ on ngwc

optional\_policy(`

polaris\_ncd\_tmp\_read(polaris\_xcopy\_script\_t)

```

')

# Execute
corecmd_exec_bin(polaris_xcopy_script_t)

#uses kernel utilities like pidof, stat
domain_read_all_domains_state(polaris_xcopy_script_t)
kernel_list_proc(polaris_xcopy_script_t)

# read /proc/cmdline
kernel_read_system_state(polaris_xcopy_script_t)
fs_getattr_tmpfs(polaris_xcopy_script_t)
fs_getattr_xattr_fs(polaris_xcopy_script_t)

# xcopy started from the smand and needs fifo
polaris_smand_use_fifo(polaris_xcopy_script_t)

# ping to check reachability
netutils_domtrans_ping(polaris_xcopy_script_t)
#
# calls mcp_chvrf.sh for ping and curl
polaris_chvrf_domtrans(polaris_xcopy_script_t)

# xcopy uses ps to find the curl process state
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_xcopy_script_t)

# Started by bexecute so it has its stdin set to telnet pty file
telnet_use_ptys(polaris_xcopy_script_t)

# stdout is set to fifo set by rotte to capture output into btrace
# btrace also need these policies :)
# btrace_init also refer to /tmp/sw/boot/..
polaris_use_btrace_fifo(polaris_xcopy_script_t)
polaris_cpld_read(polaris_xcopy_script_t)
polaris_boot_tmp_read(polaris_xcopy_script_t)

# Allow /tmp/xcopy/
type polaris_xcopy_tmp_t;
files_tmp_file(polaris_xcopy_tmp_t)
files_tmp_filetrans(polaris_xcopy_script_t, polaris_xcopy_tmp_t, { dir file })
polaris_xcopy_tmp_manage(polaris_xcopy_script_t)

# Curl writes the progress...
polaris_xcopy_tmp_manage(polaris_curl_t)

# PS command access ttyS1

```

```

term_getattr_unallocated_ttys(polaris_xcopy_script_t)

# sshpass/scp
ssh_getattr_user_home_dir(polaris_xcopy_script_t)

# sshpass uses the ptmx
term_use_ptmx(polaris_xcopy_script_t)
term_getattr_pty_fs(polaris_xcopy_script_t)

# scp uses ssh
#allow polaris_xcopy_script_t ssh_exec_t:file { execute execute_no_trans map open read };
ssh_exec(polaris_xcopy_script_t)

allow polaris_xcopy_script_t self:capability {sys_resource fsetid};
allow polaris_xcopy_script_t self:process setfscreate;
allow polaris_xcopy_script_t ssh_home_t:dir { create search };
allow polaris_xcopy_script_t devpts_t:chr_file { getattr open read setattr write };

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisxcopy.te
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#
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#
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#

## <summary>Polaris dmi_ncsshd_fwd Policy Rules.</summary>

#####
## <summary>
##   Connect to and send messages to dmi_ncsshd_bp
## tmp/.ncsshd_bp.sock unix datagram sockets.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dmi_ncsshd_fwd_dgram_send`,
    gen_require(`
        type polaris_dmi_ncsshd_log_t;
        type polaris_dmi_ncsshd_fwd_t;
    `)

```

```

allow $1 self:unix_stream_socket {create_socket_perms};
allow $1 polaris_dmi_ncsshd_fwd_t:unix_stream_socket {connectto};
write_sock_files_pattern($1, polaris_dmi_ncsshd_log_t,polaris_dmi_ncsshd_log_t)
)

#####
## <summary>
##   Write into fifo file created by dmi_ncsshd_fwd, typical case when
##   hman starts script under popen.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_dmi_ncsshd_fwd_use_fifo`,`
    gen_require(`
        type polaris_dmi_ncsshd_fwd_t;
    `)

    write_fifo_files_pattern($1, polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_fwd_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincshdfwd.if  
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```

dnl
dnl April 2018, Victor Kamensky
dnl
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dnl All rights reserved
dnl
define(`polaris_database_aux',`dnl
/tmp/rp/tlddb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)
/tmp/fp/tlddb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)
/tmp/cc/tlddb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)
/tmp/rp/tlddb/[0-9]/$2\lock -- gen_context(system_u:object_r:$1,s0)
/tmp/fp/tlddb/[0-9]/$2\lock -- gen_context(system_u:object_r:$1,s0)
/tmp/cc/tlddb/[0-9]/$2\lock -- gen_context(system_u:object_r:$1,s0)
`)

define(`polaris_database',`dnl
polaris_database_aux(database_label($1), $1)
`)

```

```
define(`polaris_database_process',`')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_db_fc.m4
```

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```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris ioxman Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
##   Manage ioxman temporary files and directories in /tmp.
```

```
## Like /tmp/ios_xml.dat.
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_iox_manage_tmp_files',`
```

```
  gen_require(`
```

```
    type polaris_iox_tmp_t;
```

```
  `)
```

```
  manage_files_pattern($1, polaris_iox_tmp_t, polaris_iox_tmp_t)
```

```
  files_tmp_filetrans($1, polaris_iox_tmp_t, file, "iox_xml.dat")
```

```
  files_tmp_filetrans($1, polaris_iox_tmp_t, file, "iox_override.conf")
```

```
  # /tmp/trace/resource.log can be created by ioxman/vman/caf
```

```
  # through sourcing in the family of the pvsm_*.sh scripts
```

```
  files_tmp_filetrans($1, polaris_iox_tmp_t, file, "resource.log")
```

```
  `)
```

```
#####
```

```
## <summary>
```

```
##   Read ioxman temporary files and directories in /tmp.
```

```
## Like /tmp/ios_xml.dat and /tmp/iox_override.conf
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```

## </param>
#
interface(`polaris_iox_read_tmp_files`,`
    gen_require(`
        type polaris_iox_tmp_t;
    `)

    read_files_pattern($1, polaris_iox_tmp_t, polaris_iox_tmp_t)
`)

#####
## <summary>
##   Make the specified domain able to work with iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox2iosd_tmp_manage`,`
    gen_require(`
        type polaris_iox2iosd_tmp_t;
    `)

    manage_dirs_pattern($1, polaris_iox2iosd_tmp_t, polaris_iox2iosd_tmp_t)
    manage_files_pattern($1, polaris_iox2iosd_tmp_t, polaris_iox2iosd_tmp_t)
`)

#####
## <summary>
##   Read ioxman executable file. Used by caf to read iosman
##   version.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ioxman_exec_read`,`
    gen_require(`
        type polaris_ioxman_exec_t;
        type bin_t;
    `)

    read_files_pattern($1, bin_t, polaris_ioxman_exec_t)
`)

```

```
#####
## <summary>
## Allow the specified domain to get show_version information
## from ioxman executable
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ioxman_show_version`,`
    gen_require(`
        type polaris_ioxman_exec_t;
    `)
    polaris_show_version($1, polaris_ioxman_exec_t)
`)
```

```
#####
## <summary>
## Allow the specified domain to get show_version information
## from dockerd and other container_runtime_t executables
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_container_runtime_show_version`,`
    gen_require(`
        type container_runtime_exec_t;
    `)
    polaris_show_version($1, container_runtime_exec_t)
`)
```

```
#####
## <summary>
## Execute a domain transition to run cat9k_ssd_auth_cmds.sh
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_ssd_auth_domtrans`,`
```

```

gen_require(
    type polaris_ssd_auth_t, polaris_ssd_auth_exec_t;
)

domtrans_pattern($1, polaris_ssd_auth_exec_t, polaris_ssd_auth_t)
)

#####
## <summary>
##   Read ssd files in /tmp/ssd_blk_device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_ssd_tmp_files',`
    gen_require(
        type polaris_ssd_auth_tmp_t;
    )

    read_files_pattern($1, polaris_ssd_auth_tmp_t, polaris_ssd_auth_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisioxman.if

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```

#
# Nov 2020, Swati Kumaro
#
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#

```

```

/dev/blzi_fpga -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_gps_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_lol_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_0 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_1 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_2 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_3 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_4 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
/dev/blzi_ts_interest_5 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisptdrp.fc
```

```
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```

```
#
```

```
# January 2021, Gabriel Lee, Shawn Liu
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisezmanage, 1.0);
```

```
type polaris_ezmanage_file_t;
```

```
files_type(polaris_ezmanage_file_t)
```

```
polaris_pfile_type(polaris_ezmanage_file_t)
```

```
polaris_process_domain_template(ezmanage)
```

```
# Allow ezManage script to be executed by systemd
```

```
gen_require(^
```

```
    type unconfined_service_t;
```

```
')
```

```
polaris_ezmanage_domtrans(unconfined_service_t)
```

```
# Allow ezManage file and directory access
```

```
polaris_manage_ezmanage_files(polaris_ezmanage_t)
```

```
# Allow ezManage socket access
```

```
allow polaris_ezmanage_t self:unix_dgram_socket { connected_socket_perms sendto };
```

```
# Allow read of /etc/passwd
```

```
auth_use_nsswitch(polaris_ezmanage_t)
```

```
# ezManage python script needs access to USB ttys for modem AT channel
```

```
term_use_usb_ttys(polaris_ezmanage_t)
```

```
# ezManage python script needs /usr/bin/python3 execution and may also call other generic system bin utilities
```

```
corecmd_exec_bin(polaris_ezmanage_t)
```

```
# ezManage needs to access /bootflash/ciscosdwan.cfg and a variably named tar file in /bootflash/modem_firmware
```

```
polaris_bootflash_filetrans(polaris_ezmanage_t, polaris_ezmanage_file_t, file, "ciscosdwan.cfg")
```

```
polaris_bootflash_filetrans(polaris_ezmanage_t, polaris_ezmanage_file_t, file, "modem_firmware.tar.gz")
```

```
# ezManage socket file is created in /var/run
```

```
type polaris_ezmanage_var_run_t;
```

```
files_pid_file(polaris_ezmanage_var_run_t)
```

```
files_pid_filetrans(polaris_ezmanage_t, polaris_ezmanage_var_run_t, sock_file, "cwan_ezmanage_py_server")
```

```

# Allow ezManage to access its socket file in /var/run
polaris_manage_ezmanage_var_run_files(polaris_ezmanage_t)

# Allow ezManage to access ngiolite socket file in /var/run
gen_require(
    type polaris_cwan_svr_var_run_t;
)
rw_sock_files_pattern(polaris_ezmanage_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)

# Allow ezManage to access ngiolite dgram_socket
gen_require(
    type polaris_ngiolite_t;
)
allow polaris_ezmanage_t polaris_ngiolite_t:unix_dgram_socket sendto;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmanage.te

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```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris dbm Policy Rules.</summary>

```

```
#####
```

```

## <summary>
##   Setup /bootflash/.dbpersist directory and content.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tldbpersist_setup`,`
    gen_require(
        type polaris_disk_bootflash_t;
        type polaris_disk_dbm_t;
    )
    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_disk_dbm_t, dir, ".dbpersist")
    # allow creation of /bootflash/.dbpersist directory
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_dbm_t)
    # dbm can manage files inside of its own polaris_disk_dbm_t directories

```

```
    manage_files_pattern($1, polaris_disk_dbm_t, polaris_disk_dbm_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbm.if
```

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```
#
# May 2017, Victor Kamensky
#
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#
```

```
# polarismdtpubd file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.fc
```

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```
#
# February 2020, Victor Kamensky
#
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#
```

```
policy_module(polaristtm, 1.0);
```

```
gen_require(
    type polaris_ttm_t;
)
```

```
polaris_chasfs_read(polaris_ttm_t)
```

```
polaris_cpld_read(polaris_ttm_t)
```

```
logging_send_syslog_msg(polaris_ttm_t)
```

```
# vconfd_load_shared_schemas
polaris_confid_shared_schema_read(polaris_ttm_t)
```

```
# /var/run/.ttmd socket and pid
type polaris_ttm_var_run_t;
files_pid_file(polaris_ttm_var_run_t)
manage_files_pattern(polaris_ttm_t, polaris_ttm_var_run_t, polaris_ttm_var_run_t)
manage_sock_files_pattern(polaris_ttm_t, polaris_ttm_var_run_t, polaris_ttm_var_run_t)
files_pid_filetrans(polaris_ttm_t, polaris_ttm_var_run_t, { file sock_file })
```

```
# allow /usr/binos/bin/ttmd to acces polaris_tdlresolve_t and
```

```

#                polaris_global_service_t
polaris_tdlresolve_manage(polaris_ttm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristtm.te
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#
# February 2020, Victor Kamensky
#
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#

policy_module(polarissdavicproxy, 1.0);

gen_require(
    type polaris_sdavic_proxy_t;
)

# btrace_application_start
polaris_chasfs_read(polaris_sdavic_proxy_t)
polaris_tdlresolve_read(polaris_sdavic_proxy_t)
polaris_cpld_read(polaris_sdavic_proxy_t)

# Allow SDAVC exports using UDP socket.
allow polaris_sdavic_proxy_t self:udp_socket create_socket_perms;

# Change namespace to allow network communication with vManage
(process_namespace_network_change_internal - opens /var/run/netns/*)
polaris_cedge_set_ns(polaris_sdavic_proxy_t)

# Reset the namespace back to default (process_namespace_network_default opens /proc/1/ns/net)
polaris_cedge_reset_ns(polaris_sdavic_proxy_t)

type polaris_sdavic_proxy_files_t;
files_type(polaris_sdavic_proxy_files_t)
polaris_pfile_type( polaris_sdavic_proxy_files_t)

# Create /bootflash/sdavic directory, Write, Read & Removed files (For SDAVC imports)
polaris_bootflash_filetrans(polaris_sdavic_proxy_t, polaris_sdavic_proxy_files_t, dir, "sdavic")
polaris_bootflash_filetrans(polaris_iosd_t, polaris_sdavic_proxy_files_t, dir, "sdavic")
polaris_sdavic_proxy_manage(polaris_sdavic_proxy_t)

# IOSd process also should have access to /bootflash/sdavic directory
gen_require(
    type polaris_iosd_t;
)

```

```
polaris_sdavc_proxy_manage(polaris_iosd_t)
```

```
# Allow SDAVC imports (HTTP GET, PUT) we use /usr/bin/curl executable.
```

```
# Exe: curl -f -s --connect-time 10 -o /bootflash/sdavc/.... -w%{http_code} http://<user>:<pw>@<vManage system ip>:<port>
```

```
# Run CURL in its domain so it wont have all sdavcproxy permissions.
```

```
gen_require(  
    type polaris_curl_t;  
)
```

```
polaris_curl_domtrans(polaris_sdavc_proxy_t)
```

```
corenet_tcp_connect_generic_port(polaris_curl_t)
```

```
# cURL process also should have access to /bootflash/sdavc directory
```

```
polaris_sdavc_proxy_manage(polaris_curl_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissdavcproxy.te
```

```
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```

```
#
```

```
# Sep 2020, Sridhar C
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/usr/binos/conf/xcopy_script.sh -- gen_context(system_u:object_r:polaris_xcopy_script_exec_t,s0)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisxcopy.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
```

```
dnl All rights reserved
```

```
dnl
```

```
divert(-1)
```

```
include(`polaris_process.m4')
```

```
dnl Stub out plaris process
```

```
define(`polaris_process',`')
```

```
dnl Stub out mqipc
```

```
define(`polaris_mqipc_service_server',`')
```

```

define(`polaris_mqipc_service_client`,``)
define(`polaris_mqipc_service_server_elastic_client`,``)

dnl Stub out lipc
define(`polaris_lipc_service_server`,``)
define(`polaris_lipc_service_client`,``)

include(`polaris_ipc_ripc.m4`)
include(`polaris_ipc_base_ripc_te.m4`)

dnl Stub out non existent one
define(`polaris_websocket_service_server`,``)
define(`polaris_cipc_service_server`,``)

include(`polaris_max_scope.m4`)

divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#

policy_module(autopolarisplatformipcbase, 1.0);

gen_require(`
    attribute port_type;
    attribute defined_port_type;
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_te.m4
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisdroputil, 1.0);

polaris_process_domain_template(droputil)

corecmd_exec_bin(polaris_droputil_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_droputil_t)

```

```

# allow read of /etc/passwd
auth_use_nsswitch(polaris_droputil_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_droputil_t)

# work with /tmp files
type polaris_droputil_tmp_t;
files_tmp_file(polaris_droputil_tmp_t)
manage_dirs_pattern(polaris_droputil_t, tmp_t, polaris_droputil_tmp_t)
manage_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
manage_fifo_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
manage_lnk_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
files_tmp_filetrans(polaris_droputil_t, polaris_droputil_tmp_t, { file dir })

# on some platform /tmp/rp/dropbox is created by binos service
# that runs under initrc_t
gen_require(
    type initrc_t;
)
files_tmp_filetrans(initrc_t, polaris_droputil_tmp_t, dir, "dropbox")

allow polaris_droputil_t self:capability { sys_resource dac_override };
allow polaris_droputil_t self:process setpgid;

polaris_btrace_data_manage(polaris_droputil_t)
polaris_cpld_read(polaris_droputil_t)
polaris_chasfs_manage(polaris_droputil_t)
polaris_boot_tmp_read(polaris_droputil_t)
polaris_read_debug_conf(polaris_droputil_t)
polaris_disk_crashinfo_getattr(polaris_droputil_t)
polaris_rmonbifo_tmp_read(polaris_droputil_t)

# runs systemctl start reflector.service
systemd_exec_systemctl(polaris_droputil_t)

# PLEASE LOOK AT ME need to have separate label for reflector.service
# allow only to start if, do it once copy of reflector.service is fixed
systemd_config_generic_services(polaris_droputil_t)

# droputil.sh delets /tmp/rp/droputil/so-del-stage/rp/0
fs_getattr_tmpfs(polaris_droputil_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdroputil.te
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```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisofa, 1.0);
```

```
gen_require(
    type polaris_ofa_t;
)
```

```
polaris_btrace_data_manage(polaris_ofa_t)
polaris_crft_data_manage(polaris_ofa_t)
polaris_chasfs_manage(polaris_ofa_t)
polaris_tdlresolve_read(polaris_ofa_t)
polaris_tdlldb_list_dirs(polaris_ofa_t)
polaris_cpld_read(polaris_ofa_t)
polaris_flashlib_read(polaris_ofa_t)
```

```
allow polaris_ofa_t self:capability sys_admin;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisofa.te
```

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
# /bootflash labels
```

```
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?     gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/.ssh/ssh_host.*_key     gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/tan(/.*)?          gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/core(/.*)?        gen_context(system_u:object_r:polaris_core_file_t,s0)
/bootflash/debug.conf        gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/bootflash/packages.conf     gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

```
# /objstore
```

```
/objstore(/.*)?          gen_context(system_u:object_r:polaris_disk_objstore_t,s0)
/dev/shm/sem\objstore_sem  gen_context(system_u:object_r:polaris_objstore_sem_t,s0)
```

```

# hanet driver used by vpcgw platform of VXE family
ifdef(`vpcgw_platform',`
/dev/hanet -c gen_context(system_u:object_r:polaris_hanet_device_t,s0)
')

# /csl_p_0
/csl_p_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)

# /csl_p_1.context
/csl_p_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)

# /csl_s_0.context
/csl_s_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /csl_s_1.context
/csl_s_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /varied
/varied(/.*)?           gen_context(system_u:object_r:polaris_disk_varied_t,s0)
/varied/.install_info   gen_context(system_u:object_r:polaris_vxeinstall_info_t,s0)
/varied/obfl_*           gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/varied/grub_cisco_version gen_context(system_u:object_r:polaris_grubver_t,s0)
/varied/grub(/.*)?       gen_context(system_u:object_r:boot_t,s0)
/varied/grub2(/.*)?      gen_context(system_u:object_r:polaris_grub_bios_t,s0)
/varied/vcpu_template.txt gen_context(system_u:object_r:polaris_iosd_vcpu_t,s0)

/sbin/grub*             gen_context(system_u:object_r:bootloader_exec_t,s0)

# /grubenv
/bootefi(/.*)?          gen_context(system_u:object_r:polaris_grub_efi_t,s0)

# from /lib/tmpfiles.d/binos-vxe.conf
/lic0 -l                 gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/lic1 -l                 gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# umbrella_ini.sh executable label
/usr/binos/conf/umbrella_init.sh -- gen_context(system_u:object_r:polaris_umbrella_init_exec_t,s0)

#
# On ultra_us /cpld_util.sh creates /tmp/chassis. Put this script into the initexec_t domain so
# chasfs transitions properly.
#
/cpld_util.sh           gen_context(system_u:object_r:initrc_exec_t,s0)

# /config labels
/config(/.*)?           gen_context(system_u:object_r:polaris_disk_config_t,s0)
/config/.ssh(/.*)?      gen_context(system_u:object_r:ssh_home_t,s0)

```

```
/config/.ssh/ssh_host.*_key\pub gen_context(system_u:object_r:ssh_key_t,s0)
/config/.ssh/ssh_host.*_key gen_context(system_u:object_r:ssh_key_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvxe.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
# All rights reserved
#

policy_module(polarisboot, 1.0);

#####
# /tmp/sw/boot policy
#####
type polaris_boot_tmp_t;
files_tmp_file(polaris_boot_tmp_t)
gen_require(
    attribute domain;
)
files_tmp_filetrans(domain, polaris_boot_tmp_t, dir, "boot")
# /tmp/sw/isos
files_tmp_filetrans(domain, polaris_boot_tmp_t, dir, "isos")

# dmesg command is executed in its own domain and result is store
# into /tmp/sw/boot/dmesg file
gen_require(
    type dmesg_t;
)
polaris_boot_tmp_write(dmesg_t)

# /tmp/reload_reason copied from /bootflash/.prst_sync/reload_info
files_tmp_filetrans(domain, polaris_boot_tmp_t, file, "reload_reason")

# /tmp/bootup_timestamp created by /etc/init.d/binos
gen_require(
    type initrc_t;
    type init_t;
)
files_tmp_filetrans({ initrc_t init_t }, polaris_boot_tmp_t, file, "bootup_timestamp")

type polaris_boot_file_t;
files_type(polaris_boot_file_t)
polaris_pfile_type(polaris_boot_file_t)
```

```
gen_require(  
    type polaris_disk_bootflash_t;  
)  
filetrans_pattern(domain, polaris_disk_bootflash_t, polaris_boot_file_t, file, "reload_info")  
filetrans_pattern(domain, polaris_disk_bootflash_t, polaris_boot_file_t, file, "stack_reload_info")
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.te

No license file was found, but licenses were detected in source scan.

```
#  
# February 2020, Victor Kamensky  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscfgmgr.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscxp.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisftm.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbgd.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfpm.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristtm.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisomp.fc  
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
# Copyright (c) 2016-2021 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris Common Policy Rules.</summary>
```

```
#####
```

```
# Polaris common
```

```
#####
```

```
#####
```

```
## <summary>
```

```
## Create a domain for long running Polaris processes in
```

```
## confined mode.
```

```
## </summary>
```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_process_domain_confined`,`
    gen_require(`
        type unconfined_service_t;
    `)
    init_daemon_domain($1, $2)

    # polaris process now started by pman, which still runs
    # under unconfined label
    type_transition unconfined_service_t $2:process $1;
    allow unconfined_service_t $1:process transition;
    allow $1 unconfined_service_t:process sigchld;

    polaris_pman_entry($1, $2)

    gen_require(`
        attribute polaris_domain;
        attribute polaris_exec_domain;
        attribute polaris_extended_domain;
    `)
    typeattribute $1 polaris_domain, polaris_extended_domain;
    typeattribute $2 polaris_exec_domain;

    # allow all process to check whether kernel ksm is enabled
    polaris_ksm_run_check($1)
)`)

#####
## <summary>
##   Create a domain for long running Polaris processes. Note
##   depending on policy build setting it could be confined or
##   not confined
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_process_domain',`

    # the default is to confine all domains
    polaris_process_domain_confined($1, $2)

    #
    # if the domain is in the permissive map, then set it to be confined
    # permissive. if the domain is in the confined map, then there really
    # isnt much else to do but leave it confined. if the domain isnt in
    # the permissive or confined maps then determine if the domain should
    # be unconfined.
    #
    ifelse(permissive_domain($1), $1, `polaris_permissive_domain_setup($1)',
        confined_domain($1), $1, `',
            `polaris_domain_maybe_unconfined($1)')
)

```

```

#####
## <summary>
## Create a domain for utility Polaris processes in
## confined mode.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_utility_domain_confined',`
    domain_type($1)
    domain_entry_file($1, $2)
    role system_r types $1;

    gen_require(`
        attribute polaris_domain;
        attribute polaris_exec_domain;
        attribute polaris_extended_domain;

```

```

    ')
    typeattribute $1 polaris_domain, polaris_extended_domain;
    typeattribute $2 polaris_exec_domain;

    # allow all process to check whether kernel ksm is enabled
    polaris_ksm_run_check($1)
    ')

#####
## <summary>
##   Create a domain for utility Polaris processes. Note
##   depending on policy build setting it could be confined or
##   not confined
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_utility_domain`,`

    # the default is to confine all domains
    polaris_utility_domain_confined($1, $2)

    #
    # if the domain is in the permissive map, then set it to be confined
    # permissive. if the domain is in the confined map, then there really
    # isnt much else to do but leave it confined. if the domain isnt in
    # the permissive or confined maps then determine if the domain should
    # be unconfined.
    #
    ifelse(permissive_domain($1), $1, `polaris_permissive_domain_setup($1)',
           confined_domain($1), $1, `',
           `polaris_domain_maybe_unconfined($1)')
    ')

#####
## <summary>
##   Creates types and rules for a basic
##   polaris process domain.
## </summary>
## <param name="stem">

```

```

## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_process_domain_template`,`
    type polaris_$1_t;
    type polaris_$1_exec_t;

    polaris_process_domain(polaris_$1_t, polaris_$1_exec_t)
    ifdef(polaris_permissive,`
        permissive polaris_$1_t;
    `)

    polaris_btrace_data_client_template($1)
    polaris_maroon_data_client_template($1)
    polaris_crft_data_client_template($1)
    polaris_process_proc_kpageflags_template($1)
    polaris_process_uswap_access(polaris_$1_t, $1, "$1")
)

#####
## <summary>
## Creates types and rules for a basic
## polaris process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_utility_domain_template`,`
    type polaris_$1_t;
    type polaris_$1_exec_t;

    polaris_utility_domain(polaris_$1_t, polaris_$1_exec_t)
    ifdef(polaris_permissive,`
        permissive polaris_$1_t;
    `)

    polaris_btrace_data_client_template($1)
    polaris_maroon_data_client_template($1)
    polaris_crft_data_client_template($1)
    polaris_process_proc_kpageflags_template($1)
)

```

```
#####
## <summary>
##   Allow the specified domain to execute polaris domain
##   process in the caller domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_exec`,`
    gen_require(`
        attribute polaris_exec_domain;
    `)

    can_exec($1, polaris_exec_domain)
`)
```

```
#####
## <summary>
##   Allow the specified domain to read polaris domain
##   executable file. I.e to get information from executables
##   like binary trace info, trace key etc
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_exec_domain`,`
    gen_require(`
        attribute polaris_exec_domain;
        type bin_t;
    `)

    read_files_pattern($1, bin_t, polaris_exec_domain)
`)
```

```
#####
## <summary>
##   Allow the specified domain to receive signals from any
##   polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```

## </summary>
## </param>
#
interface(`polaris_receive_signal_from_domain`,`
    gen_require(`
        attribute polaris_domain;
    `)

    allow polaris_domain $1:process signal_perms;
)

#####
## <summary>
## Systemd-tmpfiles utility creates an object
## in the tmp directories, with a private type using a type
## transition.
## Note rules to create files and directories which are
## performed by systemd-tmpfiles reside in /lib/tmpfiles.d/
## directory. And polaris specific rules are in binos.conf file.
## Note systemd-tmpfiles utility would use label from file_contexts
## to restore proper label. I.e the same effect could be achieved by
## placing proper .fc expression.
## </summary>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_systemd_tmpfiles_tmp_filetrans`,`
    gen_require(`
        type systemd_tmpfiles_t;
    `)

    files_tmp_filetrans(systemd_tmpfiles_t, $1, $2, $3)
)

#####
## <summary>

```

```

## socketat through get_netns_fd function call access
## /proc/pid/ns/net file
##
## Implementation notes:
##
## wants to read /proc/pid/ns/net but gets denial because our 3.10 kernel
## does not support nsfs yet, so /proc/pid/ns/net is marked as proc_t instead
## of be nsfs_t. For now allow read access to proc_t through
## kernel_system_state_reader attribute. Try to drop it in latter kernels
## type=AVC msg=audit(1479574148.450:70): avc: denied { open } for pid=27619 comm="smd"
## path="net:[4026531957]" dev="proc" ino=4026531957 scontext=system_u:system_r:polaris_smd_t:s0
## tcontext=system_u:object_r:proc_t:s0 tclass=file
## in 4.4 /proc/pid/ns/net inode is under nsfs_t, polaris_smd_t needs to
## open, getattr, and read from it
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_socketat_nsfs_read`,`
    kernel_read_system_state($1)
    fs_read_nsfs_files($1)
    gen_require(`
        type ifconfig_var_run_t;
    `)
    list_dirs_pattern($1, ifconfig_var_run_t, ifconfig_var_run_t)
`)

#####
## <summary>
## All namespace related operation to switch name space
## is covered under this macro.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_namespace_set_netns_with_etc`,`
    files_mounon_isid($1)
    files_mounon_rootfs($1)
    dev_mount_sysfs_fs($1)
    dev_unmount_sysfs_fs($1)
    sysnet_read_config($1)
    sysnet_write_config($1)
`)

```

```

    sysnet_manage_config_dirs($1)
    files_rw_etc_files($1)
    allow $1 net_conf_t:file mounton;
    allow $1 etc_t:file mounton;
    allow $1 self:capability sys_chroot;
)

#####
## <summary>
##   process can execute libeiutil build_config_directory function
##
## Implementation notes:
##   build_config_directory function from mgmt/libeiutil/src/eiutil.c
##   calls glibc nftw function, which effectively walks whole file tree
##   and execute given call back. While function is executed it needs
##   access to all files and directories attributes also it wants to
##   search all directories. But we will not grant search access to
##   security_file_type, instead we will dontaudit those. Anyway no
##   relevant config file should be under security_file_type directory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_libeiutil_build_config_directory`,`
    files_getattr_all_files($1)
    files_getattr_all_dirs($1)
    files_read_all_symlinks($1)

    files_list_non_security($1)
    files_dontaudit_list_security_dirs($1)
)

#####
## <summary>
##   Allow the specified domain to read write from i2c device.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i2c_use`,`
    gen_require(`
        type device_t;

```

```

        type polaris_i2c_device_t;
    ')

    rw_chr_files_pattern($1, device_t, polaris_i2c_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/remap_mem0
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_remap_mem_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_remap_mem_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_remap_mem_device_t)
    read_chr_files_pattern($1, device_t, polaris_remap_mem_device_t)
    allow $1 polaris_remap_mem_device_t:chr_file map;
)

#####
## <summary>
##   Allow the specified domain to read firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_read`,`
    gen_require(`
        type polaris_firmware_t;
    `)

    read_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
    # /firmware/* are link files, allow to follow symbolic link
    allow $1 polaris_firmware_t:lnk_file read;
    allow $1 polaris_firmware_t:dir read;
)

#####

```

```

## <summary>
##   Allow the specified domain to manage firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_manage`,`
    gen_require(`
        type polaris_firmware_t;
    `)

    manage_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
    manage_lnk_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
    manage_dirs_pattern($1, polaris_firmware_t, polaris_firmware_t)
`)

```

```
#####
```

```

## <summary>
##   Allow the specified domain to getattr of firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_getattr`,`
    gen_require(`
        type polaris_firmware_t;
    `)

    getattr_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
`)

```

```
#####
```

```

## <summary>
##   Allow the specified domain to map of firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_map`,`

```

```

gen_require(
    type polaris_firmware_t;
)

read_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
allow $1 polaris_firmware_t:file map;
)

#####
## <summary>
##   Allow the specified domain to write relocations into text segment, deals
## with icc broken relocations.
##
## LOOK AT ME:
## Basically it deals with denials like this:
## type=AVC msg=audit(1475815369.598:3): avc: denied { execmod } for pid=4929 comm="cman_fp"
## path="/tmp/sw/mount/csr1000v-mono-universalk9.2016-10-
## 06_20.15_kamensky.SSA.pkg/usr/cpp/lib64/libc++_client_ha_oor.so" dev="loop0" ino=7683
## scontext=system_u:system_r:unconfined_service_t:s0 tcontext=system_u:object_r:lib_t:s0 tclass=file
## It happens because icc generates code with relocations in text segment and
## run-time linker is dealing with it by doing mprotect(WRITE), relocatings,
## mprotect(NO WRITE). Remove once icc compiled is fixed
##
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_icc_broken_relocations',`
    gen_require(
        type lib_t;
    )

    allow $1 lib_t:file execmod;
)

#####
## <summary>
##   Allow the specified domain to work with /dev/mem
##
## LOOK AT ME!!! LOOK AT ME!!! Missing driver: application works
## with /dev/mem directy
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_dev_mem_use`,`
    dev_read_raw_memory($1)
    dev_write_raw_memory($1)
    allow $1 self:capability sys_rawio;
    gen_require(`
        type memory_device_t;
    `)
    allow $1 memory_device_t:chr_file map;
`)

#####
## <summary>
## Append to /tmp/etc file. First usage to update xinetd.conf
## files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_append`,`
    gen_require(`
        type polaris_etc_t;
    `)
    append_files_pattern($1, polaris_etc_t, polaris_etc_t)
`)

#####
## <summary>
## Search /tmp/etc directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_search`,`
    gen_require(`
        type polaris_etc_t;
    `)
    search_dirs_pattern($1, polaris_etc_t, polaris_etc_t)
`)

```

```

#####
## <summary>
## List the contents of /etc directories.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_list`,`
gen_require(`
type polaris_etc_t;
`)

allow $1 polaris_etc_t:dir list_dir_perms;
`)

#####
## <summary>
## Allow domain to attach to TUN devices created by ifconfig_t subject.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`ifconfig_attach_tun_iface`,`
gen_require(`
type ifconfig_t;
`)

allow $1 ifconfig_t:tun_socket relabelfrom;
allow $1 self:tun_socket relabelto;
`)

#####
## <summary>
## Perms used by pidof
## binos/infra/systemd/scripts/errmsg.sh, might needs /dev/ttyS0
## access.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>

```

```

## <rolebase/>
#
interface(`pidof_use`,`
  # FIXME or fix labeling
  # /sys/devices/system/cpu/online should be labeled cpu_online_t
  # but for some reason this did not happen, grant perms for both
  dev_read_sysfs($1)
  dev_read_cpu_online($1)
  # /proc scan
  domain_read_all_domains_state($1)
  kernel_list_proc($1)
`)

```

```
#####
```

```

## <summary>
##   Script can execute errmsg function from
##   binos/infra/systemd/scripts/errmsg.sh, might needs /dev/ttyS0
##   access.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_script_errmsg_use`,`
  # send to syslog (journal), iosd outputs to console if up
  logging_send_syslog_msg($1)
  # check if iosd is up and find its pid and if ttyS0 is opened
  pidof_use($1)
  # if FDs dont have ttyS0 it sends to console itself
  term_use_unallocated_ttys($1)
`)

```

```
#####
```

```

## <summary>
##   Allow the specified domain to read ebf (explicit
##   bindind) files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ebf_map`,`
  gen_require(`

```

```

        type polaris_ebf_t;
    ')

    read_files_pattern($1, polaris_ebf_t, polaris_ebf_t)
    allow $1 polaris_ebf_t:file map;
')

#####
## <summary>
##   Allow the specified domain to execute show_version command
## for given executable label
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="subject_exec">
##   <summary>
##     Domain of executable that version can be checked
##   </summary>
## </param>
#
interface('polaris_show_version',`
    read_files_pattern($1, $2, $2)
    allow $1 $2:file map;
')

#####
## <summary>
##   Configure the polaris domain as permissive
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface('polaris_permissive_domain_setup',`
    gen_require(
        type $1;
    )

    permissive $1;
')

```

```

#####
## <summary>
##   Creates types and rules for process access to uswap feature.
##   Ability to create file/folder under /bootflash/.USWAP/"FRU", and
##   map file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="stem">
##   <summary>
##     Stem for the object label. Name is constructed as
##     polaris_"stem"_uswap_files_t. It should be the short
##     form of the process name.
##     E.g., for IOSd polaris_iosd_uswap_files_t.
##   </summary>
## </param>
## <param name="name">
##   <summary>
##     The name of the object being created.
##     Name of the folder created by the process for
##     creating the uswap files.
##   </summary>
## </param>
#
template(`polaris_process_uswap_access`,
  gen_require(
    type polaris_uswap_files_t;
  )
  type polaris_${2}_uswap_files_t;
  files_type(polaris_${2}_uswap_files_t)
  polaris_pfile_type(polaris_${2}_uswap_files_t)

  filetrans_pattern($1, polaris_uswap_files_t, polaris_${2}_uswap_files_t, {file dir})
  manage_dirs_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
  manage_files_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
  manage_lnk_files_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
  allow $1 polaris_${2}_uswap_files_t:file map;

  # allow access to pvp to clean-up the process related uswap file/folder
  gen_require(
    type polaris_pvp_t;
  )
  allow polaris_pvp_t polaris_${2}_uswap_files_t:dir { read remove_name rmdir write };

```

```

allow polaris_pvp_t polaris_$2_uswap_files_t:file unlink;
)

#####
## <summary>
## Allow process access to to access page related files such as "/proc/kpageflags"
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_process_proc_kpageflags_template`,`
gen_require(`
type proc_t;
`)
allow polaris_$1_t proc_t:file { open read };
)

```

```

#####
## <summary>
## transition context of fman(rp/fp) created iptbl tmp files related to acl mgmt.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fman_acl_iptbl_tmp_file`,`
gen_require(`
type polaris_iptbl_tmp_t;
`)
files_tmp_filetrans($1, polaris_iptbl_tmp_t, file, "iptbl.v4")
files_tmp_filetrans($1, polaris_iptbl_tmp_t, file, "iptbl.v6")
manage_files_pattern($1, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
)

```

```

#####
## <summary>
## Manage files/folders in /tmp/rsync_log_dir.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_manage_rsync_tmplog_dir',`
    gen_require(`
        type polaris_rsync_tmp_t;
    `)
    manage_files_pattern($1, polaris_rsync_tmp_t, polaris_rsync_tmp_t)
    manage_dirs_pattern($1, polaris_rsync_tmp_t, polaris_rsync_tmp_t)
`)

```

```
#####
```

```

## <summary>
##   Manage cerr shared memory /dev/shm/cerrno_dll.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cerr_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_cerr_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_cerr_shm_t)
    allow $1 polaris_cerr_shm_t:file map;
    fs_tmpfs_filetrans($1, polaris_cerr_shm_t, file, "cerrno_dll")
`)

```

```
#####
```

```

## <summary>
##   Manage shared memory for vrf - /dev/shm/vrf_shm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_vrf_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_vrf_shm_t;
    `)
    fs_getattr_tmpfs($1)

```

```

manage_files_pattern($1, tmpfs_t, polaris_vrf_shm_t)
allow $1 polaris_vrf_shm_t:file map;
filetrans_pattern($1, tmpfs_t, polaris_vrf_shm_t, file, "vrf_shm")
)

```

```
#####
```

```

## <summary>
##   On-demand creation of vrf-based netns using "ip netns".
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_vrf_netns_manage`,`
    polaris_vrf_shm_manage($1)

    kernel_rw_net_sysctls($1)
    polaris_lfts_dev_use($1)

    sysnet_exec_ifconfig($1)
    sysnet_manage_ifconfig_run($1)
    gen_require(`
        type ifconfig_var_run_t;
    `)
    allow $1 ifconfig_var_run_t:file { create mounton open read };
    allow $1 ifconfig_var_run_t:dir mounton;

    gen_require(`
        type polaris_ip_linux_port_var_t;
    `)
    read_files_pattern($1, var_t, polaris_ip_linux_port_var_t)
    getattr_files_pattern($1, var_t, polaris_ip_linux_port_var_t)
)

```

```
#####
```

```

## <summary>
## Allow read/write of network state directory files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
##
#
interface(`polaris_kernel_rw_network_state_files`,`

```

```

gen_require(
    type proc_net_t;
)

rw_files_pattern($1, proc_net_t, proc_net_t)
)
#
#####
## <summary>
##   Allow the specified domain to send signals to
##   Binos shell
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_send_signal_to_shell')
    gen_require(
        type polaris_shell_t;
    )

    allow $1 polaris_shell_t:process signal_perms;
)

#####
## <summary>
## Execute curl in the curl domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface('polaris_curl_domtrans')
    gen_require(
        type polaris_curl_t, polaris_curl_exec_t;
    )

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_curl_exec_t, polaris_curl_t)
)

#####
## <summary>
##   Manage files and directories in /tmp directory with rsync_tmp_t

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`rsync_tmp_manage`,`
  gen_require(`
    type rsync_tmp_t;
  `)
  manage_dirs_pattern($1, rsync_tmp_t, rsync_tmp_t)
  manage_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
  manage_lnk_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
  manage_fifo_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
`)

#####
## <summary>
##   Allow the specified domain to read /tmp/ldwm_envelope file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
interface(`polaris_ldwm_envelope_read`,`
  gen_require(`
    type polaris_ldwm_envelope_tmp_t;
  `)

  read_files_pattern($1, polaris_ldwm_envelope_tmp_t, polaris_ldwm_envelope_tmp_t)
`)

#####
## <summary>
##   This is copied from polarisngwc.if since other platforms may also
##   read/write /sys/devices files. In addition to ngwc, tsn requires it.
##   Write into /sys/devices/virtual/misc/ggpiio/gpio_out_assert sysfs files.
##   or /sys/devices/platform/cpn-110-master/cpn-110-master sysfs
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
interface(`polaris_ggpiio_dev_read_write`,`
  gen_require(`

```

```

        type polaris_sysfs_ggpio_t;
    ')
    read_files_pattern($1, polaris_sysfs_ggpio_t, polaris_sysfs_ggpio_t)
    write_files_pattern($1, polaris_sysfs_ggpio_t, polaris_sysfs_ggpio_t)
')

#####
## <summary>
## Manage files under /bootflash/certs , cert files for AP
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_wlc_ap_cert_manage',`
    gen_require(`
        type polaris_ap_cert_file_t;
    ')

    manage_files_pattern($1, polaris_ap_cert_file_t, polaris_ap_cert_file_t)
    manage_dirs_pattern($1, polaris_ap_cert_file_t, polaris_ap_cert_file_t)

')

#####
## <summary>
## Manage SERDES key directoy and files
## SERDES library stores info in /tmp/serdes_asic_key_dir/*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_serdes_asic_key_tmp_manage',`
    gen_require(`
        type polaris_serdes_asic_key_tmp_t;
    ')

    files_tmp_filetrans($1, polaris_serdes_asic_key_tmp_t, {dir file}, "serdes_asic_key_dir")

    manage_dirs_pattern($1, {tmp_t polaris_serdes_asic_key_tmp_t}, polaris_serdes_asic_key_tmp_t)
    manage_files_pattern($1, polaris_serdes_asic_key_tmp_t, polaris_serdes_asic_key_tmp_t)

')

```

```
#####
## <summary>
##   Manage polaris_tech_support_tmp_t in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
interface(`polaris_tech_support_tmp_read`,`
  gen_require(`
    type polaris_tech_support_tmp_t;

  `)
  read_files_pattern($1, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)
)`)

```

```
#####
## <summary>
##   Getattr of any file under /proc/*/fd/*. Typically
##   run by lsof.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
interface(`polaris_proc_fd_all_getattr`,`

  domain_read_all_domains_state($1)
  files_getattr_all_files($1)
  files_getattr_all_dirs($1)
  files_getattr_all_sockets($1)
  files_getattr_all_pipes($1)
  files_getattr_all_chr_files($1)
  files_getattr_all_symlinks($1)
  files_read_all_dirs_except($1)
  dev_getattr_all_chr_files($1)
  dev_getattr_all_blk_files($1)
  dev_getattr_mtrr_dev($1)

  # misc socket and fifo files got created under label of its process domain
  # and since domain labels are not in file_type attribute, need special
  # permission
  gen_require(`
    attribute domain;
  `)
  allow $1 domain:{socket socket_class_set fifo_file} getattr;
)`)

```

```

    # access sysctl_rpc_t
    kernel_read_rpc_sysctls($1)
)

#####
## <summary>
##   Manage files and directories sysfs, This should only be used
##   if the interface needs sysfs_t create access. Otherwise please use
##   dev_rw_sysfs
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_sysfs_manage`,`
    gen_require(`
        type sysfs_t;
    `)
    manage_files_pattern($1, sysfs_t, sysfs_t)
)

#####
## <summary>
##   Check access to the init/systemd executable.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_init_access_check`,`
    gen_require(`
        type init_exec_t;
    `)
    init_access_check($1)
    allow $1 init_exec_t:file {open read};
    allow $1 init_exec_t:lnk_file read_lnk_file_perms;
)

#####
## <summary>
##   Manage polaris_manage_rommon_info in /tmp.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_manage_rommon_info`,`
    gen_require(`
        type polaris_rommon_info_tmp_t;
    `)
    manage_files_pattern($1, polaris_rommon_info_tmp_t, polaris_rommon_info_tmp_t)
`)

#####
## <summary>
## Allow the specified domain to manage tamlib debug file /bootflash/tamlib_dbg_log
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tamlib_dbg_file_manage`,`
    gen_require(`
        type polaris_tamlib_dbg_file_t;
    `)
    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_tamlib_dbg_file_t, file, "tamlib_dbg_log")
    manage_files_pattern($1, polaris_tamlib_dbg_file_t, polaris_tamlib_dbg_file_t)
`)

#####
## <summary>
## Allow access to /dev/DDR
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_DDR_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_DDR_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_DDR_device_t)
    read_chr_files_pattern($1, device_t, polaris_DDR_device_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscommon.if

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#
## <summary>Polaris tams_rp Policy Rules.</summary>
```

```
#####
## <summary>
##   Allow polaris_tams_rp_t unix stream socket connect
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tams_rp_socket_connect`,`
    gen_require(`
        type polaris_tams_rp_t;
    `)
    allow $1 polaris_tams_rp_t:unix_stream_socket connectto;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamsrp.if

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```
#
# August 2017, Shawn Lu
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
# polariswncd file contexts place holder
```

```
/mnt/images(/.*)?    gen_context(system_u:object_r:polaris_wlc_ap_images_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswncd.fc

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
# Copyright (c) 2016-2019 by Cisco Systems, Inc.  
# All rights reserved  
#  
  
# /harddisk /harddisk -> /misc/scratch  
/harddisk      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)  
/misc/scratch  gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)  
  
/usb0          gen_context(system_u:object_r:removable_t,s0)  
/usb1          gen_context(system_u:object_r:removable_t,s0)  
/misc/usb0     gen_context(system_u:object_r:removable_t,s0)  
/misc/usb1     gen_context(system_u:object_r:removable_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstorage.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# July 2017, Victor Kamensky  
#  
# Copyright (c) 2017-2019 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
/tmp/tam_cfg_done(/.*)? gen_context(system_u:object_r:polaris_tam_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisesgtamcfg.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# February 2020, Victor Kamensky  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris omp Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisomp.if
```

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris TDLDB Policy Rules.</summary>

#####
# Polaris tdldb (infra/tdllib)
#####

#####
## <summary>
##   Make specified domain as one of tdldb types.
## </summary>
## <param name="domain">
##   <summary>
##     The domain serving as polaris_tdldb type
##   </summary>
## </param>
#
interface(`polaris_tdldb_type`,`
    gen_require(`
        attribute polaris_tdldb;
    `)
    typeattribute $1 polaris_tdldb;
    files_type($1)
`)

#####
## <summary>
##   List directories in /tmp/[rp|fp|cc]/tdldb directories.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tdldb_list_dirs`,`
    gen_require(`
        type polaris_tdldb_t;
    `)
    list_dirs_pattern($1, polaris_tdldb_t, polaris_tdldb_t)
`)

```

```
#####
## <summary>
##   Use tdldb database files in /tmp/[rp]fp[cc]/tdldb
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="database_label">
##   <summary>
##     Database file label.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     Database file name. Also used to derive lock file name.
##   </summary>
## </param>
#
interface(`polaris_tdldb_use`,`
gen_require(`
type polaris_tdldb_t;
type tmp_t;
`)
manage_dirs_pattern($1, polaris_tdldb_t, polaris_tdldb_t)
manage_files_pattern($1, polaris_tdldb_t, $2)
allow $1 $2:file map;
allow $1 polaris_tdldb_t:file lock;
type_transition $1 polaris_tdldb_t : file $2 "$3";
type_transition $1 polaris_tdldb_t : file $2 "$3.lock";

# manage /var/tmp/tdldb_ene_fifo.0xYYYYYY files - it seems there is
# no way to assign separate label to them
manage_fifo_files_pattern($1, tmp_t, tmp_t)

# tdllib_database_handle_open_internal through libuuid calls
# uuid_generate_time_generic, which needs access to udp socket
# once it reaches get_node_id function
allow $1 self:udp_socket { create ioctl };
`)

#####
## <summary>
##   Setup tdldb database persistent files in
##           /tmp/[rp]fp[cc]/tdldb/persist-config
## </summary>
## <param name="domain">
```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="database_label">
## <summary>
## Database file label.
## </summary>
## </param>
## <param name="object">
## <summary>
## Database file name. Also used to derive lock file name.
## </summary>
## </param>
#
interface(`polaris_tmp_tlddb_persist_setup`,`
gen_require(`
type polaris_tlddb_t;
type polaris_tlddb_persist_t;
`)
filetrans_pattern($1, polaris_tlddb_t, polaris_tlddb_persist_t, dir, "persistent-config")
# allow creation of /tmp/rp/tlddb/persistent-config
manage_dirs_pattern($1, polaris_tlddb_t, polaris_tlddb_persist_t)
# Manage files inside of its own polaris_tlddb_persist_t directories
manage_files_pattern($1, polaris_tlddb_persist_t, polaris_tlddb_persist_t)
`)

#####
## <summary>
## Manage tlddb directories
## </summary>
## <param name="domain">
## <summary>
## The domain serving as polaris_tlddb type
## </summary>
## </param>
#
interface(`polaris_tlddb_manage_dirs`,`
gen_require(`
type polaris_tlddb_t;
`)
manage_dirs_pattern($1, polaris_tlddb_t, polaris_tlddb_t)
`)

#####
## <summary>
## Use polaris_dir_db_tlddb_t database.
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_db_tdldb_dir_use`,`
    gen_require(`
        type polaris_dir_db_tdldb_t;
    `)

    polaris_tdldb_use($1, polaris_dir_db_tdldb_t, DB_DIR)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdldb.if

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```

#
# August 2017, Shawn Lu
#
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#

policy_module(polariswncd, 1.0);

gen_require(`
    type polaris_wncd_t;
`)

polaris_btrace_data_manage(polaris_wncd_t)
polaris_crft_data_manage(polaris_wncd_t)
polaris_chasfs_manage(polaris_wncd_t)
polaris_tdlresolve_read(polaris_wncd_t)
polaris_tdldb_list_dirs(polaris_wncd_t)
polaris_cpld_read(polaris_wncd_t)
polaris_lua_read(polaris_wncd_t)
polaris_flashlib_read(polaris_wncd_t)

polaris_ripc_sman_ui_serv_connect(polaris_wncd_t)

polaris_db_tdldb_dir_use(polaris_wncd_t)

#wncd need setrlimit to change limit of resource
allow polaris_wncd_t self:process setrlimit;
allow polaris_wncd_t self:capability sys_resource;

```

```

#allow tcp connection from http port
allow polaris_wncd_t self:capability net_bind_service;
corenet_tcp_bind_http_port(polaris_wncd_t)

#allow udp for dhcpd
corenet_udp_bind_dhcpd_port(polaris_wncd_t)
corenet_udp_bind_generic_node(polaris_wncd_t)
allow polaris_wncd_t self:udp_socket { create_socket_perms recv_msg send_msg };

#allow AF_PACKET
allow polaris_wncd_t self:capability net_raw;
allow polaris_wncd_t self:packet_socket { create_socket_perms recv_msg send_msg };

# required in function ewlc_capwap_dgram_srvr_state_update()
allow polaris_wncd_t self:rawip_socket { create_socket_perms setopt ioctl };

corenet_raw_bind_generic_node(polaris_wncd_t)

gen_require(
    type port_t;
)
allow polaris_wncd_t port_t:rawip_socket name_bind;

#allow to read /etc/passwd
auth_use_nsswitch(polaris_wncd_t)

#stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_wncd_t)
polaris_socketat_nsfs_read(polaris_wncd_t)

#each instance of wncd has a devshell support
corenet_tcp_bind_polaris_wncd_devshell_port(polaris_wncd_t)

# extra instances of wncd do set up cyan database for given elastic number
polaris_dyncfg_setup(polaris_wncd_t)

allow polaris_wncd_t self:capability dac_override;

# wncd does ionotify for /bootflash/apple_device_map.xml file in
# wsa_notif_register_filepath function
polaris_bootflash_read(polaris_wncd_t)
polaris_persistent_watch(polaris_wncd_t)

# manage pem certificates on /bootflash
polaris_persistent_manage(polaris_wncd_t)

# for /dev/shm/cerrno_dll

```

```

polaris_cerr_shm_manage(polaris_wncd_t)

#####
# For ewlc, wncd and wncmgrd needs access to files under /mnt/images/...these
# are related to AccessPoint images
#####

type polaris_wlc_ap_images_t;
files_type(polaris_wlc_ap_images_t)

# wncd calls ewlc_get_ap_sw_version() to open/read
# /tmp/sw/rp/0/0/rp_wlc/mount/mnt/images/ap.pri/version.info
# call-chain: main -> ewlc_app_context_init -> wncd_evlib_app_init_cb ->
# ewlc_capwapac_lib_init -> capwapac_init_default_config -> ewlc_get_ap_sw_version
polaris_wlc_ap_images_read(polaris_wncd_t)

polaris_odm_clnt2svr_mqipc_create(polaris_wncd_t)

# wncd works with AF_NETLINK NLMSG_APP_SIP ewlc_sip_netlink_sock_init
allow polaris_wncd_t self:netlink_socket create_socket_perms;

logging_send_syslog_msg(polaris_wncd_t)

# binds to mdns port from mdns_ipv4_socket_init function
corenet_udp_bind_mdns_port(polaris_wncd_t)

# bind CAPWAP control and data
corenet_udp_bind_polaris_capwap_ctr_port(polaris_wncd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wncd_t)

#allow read/write/mmap access to awips file
gen_require(
type polaris_awips_signature_file_t;
)
allow polaris_wncd_t polaris_awips_signature_file_t:file { map read open getattr unlink};

# allow read / write / unlink access to /bootflash/certs
polaris_wlc_ap_cert_manage(polaris_wncd_t)

# wncd ewlc-lisp interaction module, connect to lisp map-server on port 4342
corenet_tcp_connect_lisp_cons_control_port(polaris_wncd_t)

# binds to mdns bcp port from mdns_bcp function
corenet_udp_bind_mdns_bcp_port(polaris_wncd_t)

#DB persistence
polaris_tdlbpbersist_setup(polaris_wncd_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswncd.te

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```
#
# July 2018, Victor Kamensky
#
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#

## <summary>Polaris ngwc_fed_debug Policy Rules.</summary>
```

```
#####
## <summary>
##   Connect to and send messages to /tmp/idope_svr and
##   /tmp/shfwd_svr unix datagram sockets.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fed_debug_sock_write`,
    gen_require(`
        type polaris_fed_debug_sock_t;
        type polaris_ngwc_fed_debug_mgr_t;
        type tmp_t;
    `)

    allow $1 self:unix_stream_socket {create_socket_perms};
    allow $1 polaris_ngwc_fed_debug_mgr_t:unix_stream_socket {connectto};
    write_sock_files_pattern($1, tmp_t, polaris_fed_debug_sock_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarispsd, 1.0);
```

```

gen_require(
    type polaris_psd_t;
)

polaris_btrace_data_manage(polaris_psd_t)
polaris_crft_data_manage(polaris_psd_t)
polaris_chasfs_manage(polaris_psd_t)
polaris_tdlresolve_read(polaris_psd_t)
polaris_tdlldb_list_dirs(polaris_psd_t)
polaris_cpld_read(polaris_psd_t)
polaris_flashlib_read(polaris_psd_t)

polaris_ripc_sman_ui_serv_connect(polaris_psd_t)

polaris_db_tdlldb_dir_use(polaris_psd_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_psd_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_psd_t)

# psd wants to run /usr/binos/bin/cfgwr command
corecmd_exec_bin(polaris_psd_t)
corecmd_exec_shell(polaris_psd_t)

# provide objstore access
polaris_disk_objstore_read(polaris_psd_t)

# work with /tmp files (/tmp/sh-thd-*)
type polaris_psd_tmp_t;
files_tmp_file(polaris_psd_tmp_t)
files_tmp_filetrans(polaris_psd_t, polaris_psd_tmp_t, file)
manage_files_pattern(polaris_psd_t, polaris_psd_tmp_t, polaris_psd_tmp_t)

polaris_obfl_data_read(polaris_psd_t)

allow polaris_psd_t self:capability { fsetid };

allow polaris_psd_t self:capability { dac_override chown };
allow polaris_psd_t self:netlink_route_socket rw_netlink_socket_perms;

logging_send_syslog_msg(polaris_psd_t)

#psd need detect which terminal to use as console, need read permission to ttyS*
# psd need read/write grub configure file /boot/grub/menu.*: read /boot/grub/menu.bak
# , generate /boot/grub/menu.list

```

```

# read access to bootflash for bin file loading
ifdef(`vxe_family',`
term_use_unallocated_ttys(polaris_psd_t)
polaris_legacy_grub_manage(polaris_psd_t)
polaris_bootflash_read(polaris_psd_t)
polaris_disk_varied_read(polaris_psd_t)
`)
ifdef(`wlc_family',`
term_use_unallocated_ttys(polaris_psd_t)
bootloader_rw_config(polaris_psd_t)
polaris_disk_varied_read(polaris_psd_t)
`)
ifdef(`vwlc_platform',`
polaris_legacy_grub_manage(polaris_psd_t)
polaris_bootflash_read(polaris_psd_t)
`)

polaris_disk_csl_manage(polaris_psd_t)

fs_read_nsfs_files(polaris_psd_t)

polaris_dyncfg_tmp_read(polaris_psd_t)

polaris_read_packages_conf(polaris_psd_t)

# handling /tmp/restconf
type polaris_restconf_t;
files_tmp_file(polaris_restconf_t)

files_tmp_filetrans(polaris_psd_t, polaris_restconf_t, dir, "restconf")
polaris_restconf_manage(polaris_psd_t)

# handling /tmp/.ncsshd_authorized_keys
type polaris_ncsshd_keys_t;
files_tmp_file(polaris_ncsshd_keys_t);

files_tmp_filetrans(polaris_psd_t, polaris_ncsshd_keys_t, dir, ".ncsshd_authorized_keys")
polaris_ncsshd_keys_manage(polaris_psd_t)

polaris_tmp_tlddb_persist_setup(polaris_psd_t)

polaris_tlddbpersist_setup(polaris_psd_t)

# write mem updates the grub config files
optional_policy('
polaris_grubcfg_manage(polaris_psd_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispsd.te

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#

# February 2020, Victor Kamensky

#

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#

## <summary>Polaris fpm Policy Rules.</summary>

#####

## <summary>

## Write fpm /var/run socket file

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_fpm\_var\_sock\_write`,`

gen\_require(`

type polaris\_fpm\_t;

type polaris\_fpm\_var\_run\_t;

type var\_run\_t;

`)

write\_sock\_files\_pattern(\$1, var\_run\_t, polaris\_fpm\_var\_run\_t)

allow \$1 polaris\_fpm\_t:unix\_stream\_socket { connectto };

`)

#####

## <summary>

## Manage mqipc fpm2fmrp shared memory file in /dev/shm directory

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_fpm2fmrp\_mqipc\_use`,`

gen\_require(`

type polaris\_fpm2fmrp\_mqipc\_t;

`)

polaris\_mqipc\_use(\$1, polaris\_fpm2fmrp\_mqipc\_t)

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfpm.if

No license file was found, but licenses were detected in source scan.

#

# Oct 2020, Xin Xiang

#

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#

## <summary>Polaris Doppler Policy Rules.</summary>

#####

## <summary>

## Work (read, write, ioctl) with /dev/dmabap

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_dmabap\_dev\_use`,`

gen\_require(`

type device\_t;

type polaris\_dmabap\_device\_t;

`)

write\_chr\_files\_pattern(\$1, device\_t, polaris\_dmabap\_device\_t)

read\_chr\_files\_pattern(\$1, device\_t, polaris\_dmabap\_device\_t)

allow \$1 polaris\_dmabap\_device\_t:chr\_file map;

`)

#####

## <summary>

## Work (read, write, ioctl) with /dev/dmabap

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_dplr\_dev\_use`,`

gen\_require(`

type device\_t;

```

        type polaris_dplr_device_t;
    )
    write_chr_files_pattern($1, device_t, polaris_dplr_device_t)
    read_chr_files_pattern($1, device_t, polaris_dplr_device_t)
    allow $1 polaris_dplr_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdoppler.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

```

```

/usr/binos/conf/pvp.sh -- gen_context(system_u:object_r:polaris_pvp_exec_t,s0)
/tmp/sw/rp/max_elastic_bays -- gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
/tmp/iosd_memory_share -- gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)

```

```

/tmp/cc/0(/.*)?          gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
/tmp/cc/.*pvp(/.*)?     gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
/tmp/fp/pvp(/.*)?       gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
/tmp/rp/pvp/oir/sw_lic_service(/.*)?  gen_context(system_u:object_r:polaris_chasfs_t,s0)
/tmp/rp/pvp/oir/sw_csl_service(/.*)?  gen_context(system_u:object_r:polaris_chasfs_t,s0)
/tmp/rp/pvp/oir/rp_(.*)/(.*)?         gen_context(system_u:object_r:polaris_chasfs_t,s0)
/tmp/rp/pvp(/.*)?         gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)

```

```

/tmp/rp/pvp/sai_process(/.*)?         gen_context(system_u:object_r:polaris_pvp_sai_t,s0)
/tmp/fp/pvp/sai_process(/.*)?         gen_context(system_u:object_r:polaris_pvp_sai_t,s0)
/tmp/cc/.*pvp/sai_process(/.*)?       gen_context(system_u:object_r:polaris_pvp_sai_t,s0)

```

```

/tmp/rp/pvp/process_state(/.*)?       gen_context(system_u:object_r:polaris_process_state_t,s0)
/tmp/fp/pvp/process_state(/.*)?       gen_context(system_u:object_r:polaris_process_state_t,s0)
/tmp/cc/pvp/process_state(/.*)?       gen_context(system_u:object_r:polaris_process_state_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispvp.fc

No license file was found, but licenses were detected in source scan.

```

#
# August 2017, Shawn Lu
#
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#

```

```

policy_module(polariswlc, 1.0);

# hanet driver used by vwlc, is there better place for it?
type polaris_hanet_device_t;
dev_node(polaris_hanet_device_t)

gen_require(
    type polaris_wlc_ap_images_t;
    type mnt_t;
    attribute polaris_extended_domain;
)

# transition when /mnt/images is created
filetrans_pattern(polaris_extended_domain, mnt_t, polaris_wlc_ap_images_t, dir, "images")

# epaN and epactrlN devices
type polaris_epa_device_t;
dev_node(polaris_epa_device_t)

# luna_fpgs device
type polaris_luna_mbfpga_device_t;
dev_node(polaris_luna_mbfpga_device_t)

# astro device
type polaris_astro_device_t;
dev_node(polaris_astro_device_t)

# cpp_il device
type polaris_cpp_il_device_t;
dev_node(polaris_cpp_il_device_t)

# oob_evfc device
type polaris_oob_evfc_device_t;
dev_node(polaris_oob_evfc_device_t)

# on vwlc all processes read grub_cisco_version in polaris_disk_varied_t
gen_require(
    attribute polaris_domain;
)
polaris_disk_varied_search(polaris_domain)

# /dev/sfp-ktr device
type polaris_sfp_katar_device_t;
dev_node(polaris_sfp_katar_device_t)

# handle /tmp/vxe_disk_XXX_YYY files
ifdef(^vwlc_platform',`

```

```

gen_require(
    type unconfined_service_t;
)
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v3")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v4")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v3")
polaris_boot_tmp_manage(unconfined_service_t)
)
type polaris_grubver_t;
polaris_pfile_type(polaris_grubver_t)

type polaris_grub_bios_t;
polaris_pfile_type(polaris_grub_bios_t)

#on vWLC, all processes read grubenv from EFI disk partition.
gen_require(
    attribute polaris_domain;
)
polaris_vwlc_grub_efi_search(polaris_domain)

type polaris_vwlcinstall_info_t;
polaris_pfile_type(polaris_vwlcinstall_info_t)

gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
)
# unconfined service create /boot/.install_info if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_vwlcinstall_info_t, file, ".install_info")

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswlc.te
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#
# March 2017, Victor Kamensky
#
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#

/tmp/sw/boot/rmonbifo(/.*)?          gen_context(system_u:object_r:polaris_rmonbifo_tmp_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

# polarisbtlogger file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.fc

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polarisnifmgr, 1.0);

gen\_require(^

    type polaris\_nif\_mgr\_t;

')

polaris\_rpc\_sman\_ui\_serv\_connect(polaris\_nif\_mgr\_t)

polaris\_btrace\_data\_manage(polaris\_nif\_mgr\_t)

polaris\_crft\_data\_manage(polaris\_nif\_mgr\_t)

polaris\_chasfs\_manage(polaris\_nif\_mgr\_t)

polaris\_tdlresolve\_read(polaris\_nif\_mgr\_t)

polaris\_tdlldb\_list\_dirs(polaris\_nif\_mgr\_t)

polaris\_cpld\_read(polaris\_nif\_mgr\_t)

polaris\_lua\_read(polaris\_nif\_mgr\_t)

polaris\_flashlib\_read(polaris\_nif\_mgr\_t)

#If romvar is not set, Set Rommon env variable needs write permission

polaris\_flashlib\_write(polaris\_nif\_mgr\_t)

logging\_send\_syslog\_msg(polaris\_nif\_mgr\_t)

# set out of band interface mac set\_oobndif\_mac

allow polaris\_nif\_mgr\_t self:tcp\_socket ioctl;

```

# communication between the nif manager and fed use directories under /tmp/sv
polaris_sv_tmp_use(polaris_nif_mgr_t)

# /dev/shm/sdm access
optional_policy(
polaris_sdm_shm_manage(polaris_nif_mgr_t)
')

# open /dev/ttyS0 console in sco_sys_init_sw_params
term_use_unallocated_ttys(polaris_nif_mgr_t)

# allow create and write access to the /proc/*_sesa file

gen_require(
type polaris_proc_sesa_t;
')
polaris_proc_sesa_create_write(polaris_nif_mgr_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.te
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#
# April 2017, Victor Kamensky
#
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#

policy_module(polarisdmiopdatamgrd, 1.0);

gen_require(
    type polaris_dmi_opdatamgrd_t;
')

# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_dmi_opdatamgrd_t)

# work with /var/log/dmi/ files
type polaris_dmi_var_log_t;
logging_log_file(polaris_dmi_var_log_t)
manage_files_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, polaris_dmi_var_log_t)
manage_dirs_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, polaris_dmi_var_log_t)
logging_log_filetrans(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, dir, "dmi")

polaris_chasfs_manage(polaris_dmi_opdatamgrd_t)

```

```

polaris_btrace_data_manage(polaris_dmi_opdatamgrd_t)
polaris_cpuld_read(polaris_dmi_opdatamgrd_t)
polaris_boot_tmp_read(polaris_dmi_opdatamgrd_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_dmi_opdatamgrd_t)

# this (opdatamgrd.sh) process is shell script need permission to execute shell
# and variety of small util commands under bin_t
corecmd_exec_shell(polaris_dmi_opdatamgrd_t)
corecmd_exec_bin(polaris_dmi_opdatamgrd_t)

# allow read of /etc/passwd
# passwd_file_t:file { getattr open read };
auth_use_nsswitch(polaris_dmi_opdatamgrd_t)

# opdatamgrd.sh calls ps command
# ps needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_dmi_opdatamgrd_t)
# ps needs access to proc_t
kernel_read_system_state(polaris_dmi_opdatamgrd_t)

allow polaris_dmi_opdatamgrd_t self:capability { sys_resource dac_override };

# handling of /tmp/stream-parsers
type polaris_dmi_parser_t;
files_tmp_file(polaris_dmi_parser_t)
files_tmp_filetrans(polaris_dmi_opdatamgrd_t, polaris_dmi_parser_t, dir, "stream-parsers")
manage_dirs_pattern(polaris_dmi_opdatamgrd_t, tmp_t, polaris_dmi_parser_t)
manage_files_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_parser_t, polaris_dmi_parser_t)

mount_domtrans(polaris_dmi_opdatamgrd_t)

# confd_cli runs under our label
allow polaris_dmi_opdatamgrd_t self:tcp_socket create_socket_perms;

# runs ps that wants to have access to containers files
optional_policy(`
polaris_disk_vman_dir_list(polaris_dmi_opdatamgrd_t)
`)
polaris_sandbox_file_dir_list(polaris_dmi_opdatamgrd_t)
polaris_sandbox_file_getattr(polaris_dmi_opdatamgrd_t)

# runs find to search all 'parse.*' files
# find . -perm /111 -name parse.* -exec basename {} ;
# LOOK AT ME it seems that it does search on customer visible
# directories, can and whether customer supposed to be
# able give parse.* files to dmi opdatamgrd, could it

```

```

# be exploited?
files_getattr_all_files(polaris_dmi_opdatamgrd_t)
files_getattr_all_dirs(polaris_dmi_opdatamgrd_t)

# access to /dev/pts/0
ssh_use_ptys(polaris_dmi_opdatamgrd_t)

# directly work with to /dev/ttyS1
term_use_unallocated_ttys(polaris_dmi_opdatamgrd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.te
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# March 2017, Victor Kamensky
#
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#

## <summary>Polaris ngwc_fed Policy Rules.</summary>

#####
## <summary>
##   Connect to and send messages to /tmp/dbgmn_log_sv unit
##   datagram socket.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fed_sock_write`,
    gen_require(`
        type polaris_fed_sock_t;
        type polaris_ngwc_fed_t;
        type tmp_t;
    `)

    allow $1 self:unix_stream_socket {create_socket_perms};
    allow $1 polaris_ngwc_fed_t:unix_stream_socket {connectto};
    write_sock_files_pattern($1, tmp_t, polaris_fed_sock_t)
)

#####
## <summary>

```

```

## Allow the specified domain able to read fed /tmp files.
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
## File name in /tmp that the fed domain creates and other domains
## access.
## </summary>
## </param>
#
interface(`polaris_fed_tmp_files_read`,`
    gen_require(`
        type polaris_fed_tmp_t;
    `)

    read_files_pattern($1, polaris_fed_tmp_t, polaris_fed_tmp_t)
`)

#####
## <summary>
## Allow to read and write /tmp/epc_ws/fed_to_wif_pipe file.
## </summary>
## <param name="domain">
## <summary>
## epc_ws_liaison and ngwc-fed pipe interaction.
## </summary>
## </param>
#
interface(`polaris_fed_shm_file_read`,`
    gen_require(`
        type polaris_ngwc_fed_t;
    `)

    allow $1 polaris_ngwc_fed_t:shm { associate read unix_read unix_write write };
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.if

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#

# August 2017, Shawn Lu

#

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#

# polarismobilityd file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismobilityd.fc

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#

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#

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#

policy\_module(polarisdmi\_vtys\_serverutild, 1.0);

```
gen_require(  
    type polaris_dmi_vtys_serverutild_t;  
)
```

polaris\_btrace\_data\_manage(polaris\_dmi\_vtys\_serverutild\_t)

polaris\_chasfs\_manage(polaris\_dmi\_vtys\_serverutild\_t)

polaris\_tdlresolve\_read(polaris\_dmi\_vtys\_serverutild\_t)

polaris\_tdlldb\_list\_dirs(polaris\_dmi\_vtys\_serverutild\_t)

polaris\_cpld\_read(polaris\_dmi\_vtys\_serverutild\_t)

polaris\_flashlib\_read(polaris\_dmi\_vtys\_serverutild\_t)

allow polaris\_dmi\_vtys\_serverutild\_t self:socket { connect create read write };

type polaris\_dmi\_vtys\_serverutild\_tmp\_t;

files\_tmp\_file(polaris\_dmi\_vtys\_serverutild\_tmp\_t)

files\_tmp\_filetrans(polaris\_dmi\_vtys\_serverutild\_t, polaris\_dmi\_vtys\_serverutild\_tmp\_t, fifo\_file, ".DMI\_FIFO")

manage\_fifo\_files\_pattern(polaris\_dmi\_vtys\_serverutild\_t,

polaris\_dmi\_vtys\_serverutild\_tmp\_t, polaris\_dmi\_vtys\_serverutild\_tmp\_t)

logging\_send\_syslog\_msg(polaris\_dmi\_vtys\_serverutild\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmi\_vtys\_serverutild.te

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```
dnl
define(`mqipc_stem', `translit(patsubst($1, `mqipc$', `'), `-', `_'))
define(`mqipc_label', `format(`polaris_%s_mqipc_t', mqipc_stem($1))')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_mqipc.m4

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```
#
# November 2020, Christine Hwang
#
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#
## <summary>Polaris Cabo GNSS Policy Rules.</summary>
```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/ttyS1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_cabo_gnss_dev_use', `
    gen_require(`
        type device_t;
        type polaris_cabo_gnss_device_t;
    ')
    write_chr_files_pattern($1, device_t, polaris_cabo_gnss_device_t)
    read_chr_files_pattern($1, device_t, polaris_cabo_gnss_device_t)
    allow $1 polaris_cabo_gnss_device_t:chr_file map;
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscabognss.if

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```
#
# June 2017, Victor Kamensky
#
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#
```

```

policy_module(polaristservice, 1.0);

polaris_process_domain_template(tservice_telnet)

polaris_process_domain_template(tservice_ssh)

gen_require(
    type inetd_exec_t, inetd_t;
)
domtrans_pattern(polaris_tservice_telnet_t, inetd_exec_t, inetd_t)

polaris_chasfs_manage(polaris_tservice_telnet_t)
polaris_btrace_data_manage(polaris_tservice_telnet_t)
polaris_cpld_read(polaris_tservice_telnet_t)
polaris_boot_tmp_read(polaris_tservice_telnet_t)
polaris_rmonbifo_tmp_read(polaris_tservice_telnet_t)

corecmd_exec_shell(polaris_tservice_telnet_t)
corecmd_exec_bin(polaris_tservice_telnet_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_tservice_telnet_t)

dmidecode_domtrans(polaris_tservice_telnet_t)

allow polaris_tservice_telnet_t self:capability sys_resource;
kernel_read_system_state(polaris_tservice_telnet_t)

gen_require(
    type initrc_exec_t, initrc_t;
)
domtrans_pattern(polaris_tservice_telnet_t, initrc_exec_t, initrc_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_tservice_telnet_t)

# /bin/sh /usr/binos/conf/mcp_chvrf.sh eobc /usr/sbin/xinetd -f
# /tmp/chassis/local/rp/chasfs/rp/0/0/etc/telnet/xinetd_telnetd.conf
polaris_chvrf_domtrans(polaris_tservice_telnet_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristservice.te
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#
# August 2017, Shawn Lu
#
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```

```

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#

## <summary>Polaris WLC Platform Policy Rules.</summary>

#####
## <summary>
##   Work (read, write, ioctl) with /dev/hanet
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_hanet_dev_use`,`
gen_require(`
    type device_t;
    type polaris_hanet_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_hanet_device_t)
    read_chr_files_pattern($1, device_t, polaris_hanet_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/epa[0-9]* and
## /dev/epactrl[0-9]*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_epa_dev_use`,`
gen_require(`
    type device_t;
    type polaris_epa_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_epa_device_t)
    read_chr_files_pattern($1, device_t, polaris_epa_device_t)
    allow $1 polaris_epa_device_t:chr_file map;
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/luna_mbfpga device

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_luna_mbfpga_dev_use`,`
gen_require(`
    type device_t;
    type polaris_luna_mbfpga_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_luna_mbfpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_luna_mbfpga_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/astro device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_astro_dev_use`,`
gen_require(`
    type device_t;
    type polaris_astro_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_astro_device_t)
    read_chr_files_pattern($1, device_t, polaris_astro_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cpp_il device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_il_dev_use`,`
gen_require(`
    type device_t;

```

```

type polaris_cpp_il_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_cpp_il_device_t)
    read_chr_files_pattern($1, device_t, polaris_cpp_il_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/oob_evfc device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_oob_evfc_dev_use`,`
gen_require(`
    type device_t;
    type polaris_oob_evfc_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_oob_evfc_device_t)
    read_chr_files_pattern($1, device_t, polaris_oob_evfc_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/sfp-ktr device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sfp_katar_dev_use`,`
gen_require(`
    type device_t;
    type polaris_sfp_katar_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_sfp_katar_device_t)
    read_chr_files_pattern($1, device_t, polaris_sfp_katar_device_t)
)

#####
## <summary>
##   Read vWLC install info files
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vwlcinstall_info_read`,`
gen_require(`
type polaris_vwlcinstall_info_t;
`)
read_files_pattern($1, polaris_vwlcinstall_info_t, polaris_vwlcinstall_info_t)
list_dirs_pattern($1, polaris_vwlcinstall_info_t, polaris_vwlcinstall_info_t)
`)

```

```
#####
```

```

## <summary>
## Read /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vwlc_grub_info_read`,`
gen_require(`
type polaris_grubver_t;
type polaris_grub_bios_t;
type polaris_grub_efi_t;
`)
read_files_pattern($1, polaris_grubver_t, polaris_grubver_t)
read_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
read_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
list_dirs_pattern($1, polaris_grubver_t, polaris_grubver_t)
list_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
list_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```
#####
```

```

## <summary>
## Search /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_vwlc_grub_efi_search`,`
gen_require(`
type polaris_grub_efi_t;
`)
search_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/vda1 device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vwlc_grub_efi_use`,`
gen_require(`
type polaris_grub_efi_t;
`)
write_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
read_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswlc.if  
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dnl

```
define(`database_stem', `translit(patsubst($1, `_DB$', ``), `A-Z', `a-z'))
```

```
define(`database_label', `format(`polaris_%s_db_tldb_t', database_stem($1))')
```

```
define(`database_use_map', `defn(format(``database_use_map[%s-%s]", `$1', `$2'))')
```

```
define(`database_use_map_set', `define(format(``database_use_map[%s-%s]", `$1', `$2'), `$3'))
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_db.m4  
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#

# April 2017, Victor Kamensky

#

```

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#

policy_module(polarisdmi_dmi_authd, 1.0);

gen_require(
    type polaris_dmi_dmi_authd_t;
)

polaris_btrace_data_manage(polaris_dmi_dmi_authd_t)
polaris_crft_data_manage(polaris_dmi_dmi_authd_t)
polaris_chasfs_manage(polaris_dmi_dmi_authd_t)
polaris_tdlresolve_read(polaris_dmi_dmi_authd_t)
polaris_tdlldb_list_dirs(polaris_dmi_dmi_authd_t)
polaris_cpld_read(polaris_dmi_dmi_authd_t)
polaris_flashlib_read(polaris_dmi_dmi_authd_t)

polaris_ripc_sman_ui_serv_connect(polaris_dmi_dmi_authd_t)

polaris_db_tdlldb_dir_use(polaris_dmi_dmi_authd_t)

# dmi_authd creates and binds to /tmp/.DmiAuth.socket unix socket
type polaris_dmi_dmi_authd_tmp_t;
files_tmp_file(polaris_dmi_dmi_authd_tmp_t)
files_tmp_filetrans(polaris_dmi_dmi_authd_t, polaris_dmi_dmi_authd_tmp_t, { sock_file fifo_file })
manage_sock_files_pattern(polaris_dmi_dmi_authd_t, polaris_dmi_dmi_authd_tmp_t, polaris_dmi_dmi_authd_tmp_t)
manage_fifo_files_pattern(polaris_dmi_dmi_authd_t, polaris_dmi_dmi_authd_tmp_t, polaris_dmi_dmi_authd_tmp_t)

# dmi_authd creates diagnostic files in /tmp/netconf-yang-diag
type polaris_dmi_dmi_authd_tmp_diags_t;
files_tmp_file(polaris_dmi_dmi_authd_tmp_diags_t)
files_tmp_filetrans(polaris_dmi_dmi_authd_t, polaris_dmi_dmi_authd_tmp_diags_t, dir, "netconf-yang-diag")
polaris_dmi_authd_tmp_diags_manage(polaris_dmi_dmi_authd_t)

logging_send_syslog_msg(polaris_dmi_dmi_authd_t)

# read confd log file and push into btrace
polaris_conf_d_log_read(polaris_dmi_dmi_authd_t)

# from dmilib iosplib connect through libiospl iospl_token_read_from_file
# iospl_token_read_from_file reads /tmp/rp/.iospl_dmi_authd
polaris_dmi_authd_token_read(polaris_dmi_dmi_authd_t)

gen_require(
    type polaris_conf_d_tmp_t;
)

# This is applicable to wireless platforms running in standby monitoring mode

```

```

# wherein dmiauthd create temporary files in /tmp/confd upon switchover and
# trigger ConfD restart.
manage_files_pattern(polaris_dmi_dmiauthd_t, polaris_confd_tmp_t, polaris_confd_tmp_t)
manage_dirs_pattern(polaris_dmi_dmiauthd_t, polaris_confd_tmp_t, polaris_confd_tmp_t)

#####
# "show netconf-yang diagnostics [all | last | message]" invokes
# /usr/bin/conf/dmid_diag_logs.sh
#####

polaris_utility_domain_template(dmid_diag_logs)

polaris_bexecute_domtrans(polaris_dmi_dmiauthd_t)
polaris_bexecute_domain(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_exec_t)

# signal sent during the show cmd
polaris_send_signal_to_bexecute(polaris_dmi_dmiauthd_t)

# read files in /tmp/netconf-yang-diag
polaris_dmiauthd_tmp_diags_read(polaris_dmid_diag_logs_t)

# need write/iocctl/getattr access for pipes
polaris_dmiauthd_use_fifo(polaris_dmid_diag_logs_t)

polaris_use_btrace_fifo(polaris_dmid_diag_logs_t)
polaris_btrace_data_manage(polaris_dmid_diag_logs_t)
polaris_chasfs_read(polaris_dmid_diag_logs_t)
polaris_cpld_read(polaris_dmid_diag_logs_t)
dev_read_sysfs(polaris_dmid_diag_logs_t)
auth_use_nsswitch(polaris_dmid_diag_logs_t)
polaris_boot_tmp_read(polaris_dmid_diag_logs_t)
fs_getattr_tmpfs(polaris_dmid_diag_logs_t)

# bash tmp files, such as /tmp/sh-thd-1599654988
type polaris_dmid_diag_logs_tmp_t;
files_tmp_file(polaris_dmid_diag_logs_tmp_t)
files_tmp_filetrans(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_tmp_t, file)
manage_files_pattern(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_tmp_t, polaris_dmid_diag_logs_tmp_t)

# execute /bin/sed
corecmd_exec_bin(polaris_dmid_diag_logs_t)

#####
# Allow diagnostics feature to create log file in bootflash
#####

# execute /bin/tar
corecmd_exec_bin(polaris_dmi_dmiauthd_t)

```

```
# tar reads /etc/passwd
auth_use_nsswitch(polaris_dmi_dmiauthd_t)
# create log file in bootflash
polaris_bootflash_manage(polaris_dmi_dmiauthd_t)
```

```
#####
```

```
allow polaris_dmi_dmiauthd_t self:capability sys_resource;
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.te
```

```
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```

```
#
# May 2017, Victor Kamensky
#
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#
```

```
/opt/confd/bin/confd -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/opt/confd/lib/confd/lib/core/confd/priv/mmap_schema --
gen_context(system_u:object_r:polaris_mmap_schema_exec_t,s0)
/usr/binos/bin/vip-confd-startup.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/usr/bin/vconfd_script_cdb_backup.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/usr/binos/conf/execute_conf_d_cli.sh -- gen_context(system_u:object_r:polaris_confd_cli_exec_t,s0)
/usr/binos/conf/confd_logs.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/var/confd0(/.*)? gen_context(system_u:object_r:polaris_confd_var_t,s0)
/dev/shm/confd(/.*)? gen_context(system_u:object_r:polaris_confd_shm_t,s0)
/tmp/confd(/.*)? gen_context(system_u:object_r:polaris_confd_tmp_t,s0)
/tmp/confd_cli(/.*)? gen_context(system_u:object_r:polaris_confd_cli_tmp_t,s0)
/tmp/vconfd(/.*)? gen_context(system_u:object_r:polaris_vconfd_tmp_t,s0)

/usr/bin/vconfd_script_*.admin_tech.*.sh -- gen_context(system_u:object_r:polaris_admin_tech_exec_t,s0)
/var/tech(/.*)? gen_context(system_u:object_r:polaris_admin_tech_var_t,s0)

/bootflash/admintech gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/admintech_trace gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/MEMORY_LOG_*.text gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/collated_log_* gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)

/bootflash/tracelogs/cia-netconf-trace\.* gen_context(system_u:object_r:polaris_confd_var_log_t,s0)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisconfd.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# September 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisunconfined, 1.0);
```

```
## <desc>
```

```
## <p>
```

```
## IOSd runs in unconfined mode
```

```
## </p>
```

```
## </desc>
```

```
gen_tunable(polaris_unconfined_iosd, true)
```

```
## <desc>
```

```
## <p>
```

```
## All polaris processes except IOSd runs in unconfined mode
```

```
## </p>
```

```
## </desc>
```

```
gen_tunable(polaris_unconfined_all, true)
```

```
gen_require(^
```

```
    type apmd_t;
```

```
    type auditd_t;
```

```
    type inetd_t;
```

```
    type init_t;
```

```
    type initrc_t;
```

```
    type journalctl_t;
```

```
    type rpcbind_t;
```

```
    type rpcd_t;
```

```
    type sshd_t;
```

```
    type syslogd_t;
```

```
    type telnetd_t;
```

```
    type udev_t;
```

```
    type virtd_t;
```

```
    type virtlogd_t;
```

```
    type vmtools_t;
```

```
    type ifconfig_t;
```

```
    type setfiles_t;
```

```
    type iptables_t;
```

```
    type virsh_t;
```

```
    type svirt_t;
```

```
    type svirt_lxc_net_t;
```

```
    type virtd_lxc_t;
```

```
')
```

```
polaris_domain_maybe_unconfined(apmd_t)
```

polaris\_domain\_maybe\_unconfined(auditd\_t)  
polaris\_domain\_maybe\_unconfined(inetd\_t)  
polaris\_domain\_maybe\_unconfined(init\_t)  
polaris\_domain\_maybe\_unconfined(initrc\_t)  
polaris\_domain\_maybe\_unconfined(journalctl\_t)  
polaris\_domain\_maybe\_unconfined(rpcbind\_t)  
polaris\_domain\_maybe\_unconfined(rpcd\_t)  
polaris\_domain\_maybe\_unconfined(sshd\_t)  
polaris\_domain\_maybe\_unconfined(syslogd\_t)  
polaris\_domain\_maybe\_unconfined(telnetd\_t)  
polaris\_domain\_maybe\_unconfined(udev\_t)  
polaris\_domain\_maybe\_unconfined(virt\_d\_t)  
polaris\_domain\_maybe\_unconfined(virtlogd\_t)  
polaris\_domain\_maybe\_unconfined(vmtools\_t)  
polaris\_domain\_maybe\_unconfined(ifconfig\_t)  
polaris\_domain\_maybe\_unconfined(setfiles\_t)  
polaris\_domain\_maybe\_unconfined(iptables\_t)  
polaris\_domain\_maybe\_unconfined(virsh\_t)  
polaris\_domain\_maybe\_unconfined(svirt\_t)  
polaris\_domain\_maybe\_unconfined(svirt\_lxc\_net\_t)  
polaris\_domain\_maybe\_unconfined(virt\_d\_lxc\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisunconfined.te

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#

# July 2020, Victor Kamensky

#

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#

/tmp/HTX-IOX(/.\*)? gen\_context(system\_u:object\_r:polaris\_htx\_iox\_tmp\_t,s0)

# /dev/sppi\_memif htx works with

/dev/sppi\_memif -c gen\_context(system\_u:object\_r:polaris\_sppi\_memif\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.fc

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#

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#

```
/usr/binos/conf/periodic.sh -- gen_context(system_u:object_r:polaris_periodic_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisperiodic.fc
```

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```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polarislua, 1.0);
```

```
#####  
# Lua policy  
#####  
type polaris_lua_file_t;  
files_type(polaris_lua_file_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislua.te
```

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```
#  
# November 2020, Christine Hwang  
#  
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#
```

```
policy_module(polariscabognss, 1.0);
```

```
gen_require(  
    type polaris_cabo_gnss_t;  
)
```

```
polaris_btrace_data_manage(polaris_cabo_gnss_t)  
polaris_chasfs_manage(polaris_cabo_gnss_t)  
polaris_tdlresolve_read(polaris_cabo_gnss_t)  
polaris_cpld_read(polaris_cabo_gnss_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_cabo_gnss_t)
```

```
# Allow sysfs read for platform ID and  
# r/w on /sys/class/gpio/export
```

```
polaris_sysfs_manage(polaris_cabo_gnss_t)
dev_manage_sysfs_dirs(polaris_cabo_gnss_t)

# Allow Cabo GNSS to access/modify to GPS GPIO
polaris_ggpio_dev_read_write(polaris_cabo_gnss_t)

# Allow Cabo GNSS access to /dev/ppp0
dev_rw_realtime_clock(polaris_cabo_gnss_t)

# allow system time capability to check for system timeout
allow polaris_cabo_gnss_t self:capability sys_time;

# Label Cabo GNSS TTY device
type polaris_cabo_gnss_device_t;
dev_node(polaris_cabo_gnss_device_t)

polaris_cabo_gnss_dev_use(polaris_cabo_gnss_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscabognss.te
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```

```
dnl
dnl April 2018, Victor Kamensky
dnl
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dnl All rights reserved
dnl
dnl WLC Platform Max Bay Limits
max_bay_map_set(^rp', `per_bay', 0)
max_bay_map_set(^cc', `per_bay', 1)
max_bay_map_set(^fp', `per_bay', 0)

max_bay_ripc_map_set(^rp', `per_bay', 0)
max_bay_ripc_map_set(^cc', `per_bay', 1)
max_bay_ripc_map_set(^fp', `per_bay', 0)

max_bay_ripc_map_set(^rp', `global', 0)
max_bay_ripc_map_set(^cc', `global', 1)
max_bay_ripc_map_set(^fp', `global', 0)

dnl in elastic scope each process has its own value
max_elastic_map_set(^rp', `elastic', BPROC_ODM, 1)
max_elastic_map_set(^cc', `elastic', BPROC_ODM, 1)
max_elastic_map_set(^fp', `elasitic', BPROC_ODM, 1)

max_elastic_map_set(^rp', `elastic', BPROC_WNCD, 7)
max_elastic_map_set(^cc', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_map_set(`fp', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`rp', `elastic', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(`cc', `elastic', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(`fp', `elasitc', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(`rp', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`cc', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`fp', `elastic', BPROC_WNCD, 7)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/wlcmaps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris rogued Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrogued.if
```

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```
#
```

```
# August 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris flashcheck Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.if
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarissmd, 1.0);
```

```

gen_require(
    type polaris_smd_t;
)

#####
# mqipc manual, one that missing in platform tdl file
#####

polaris_btrace_data_manage(polaris_smd_t)
polaris_crft_data_manage(polaris_smd_t)
polaris_chasfs_manage(polaris_smd_t)
polaris_tdlresolve_read(polaris_smd_t)
polaris_tdlldb_list_dirs(polaris_smd_t)
polaris_cpld_read(polaris_smd_t)
polaris_lua_read(polaris_smd_t)
polaris_flashlib_read(polaris_smd_t)

polaris_ripc_sman_ui_serv_connect(polaris_smd_t)

# working with smd persistent/ disk files
type polaris_smd_disk_t;
polaris_disk_type(polaris_smd_disk_t)

manage_files_pattern(polaris_smd_t, polaris_smd_disk_t, polaris_smd_disk_t)

polaris_db_tdlldb_dir_use(polaris_smd_t)

# access to persist tdlldb (e.g. .dbpersist)
polaris_tdlldbpersist_setup(polaris_smd_t)

# for /dev/shm/cerrno_dell
polaris_cerr_shm_manage(polaris_smd_t)

#ifdef(^nyquist_platform',`
gen_require(
    type polaris_bt_logger_smd_mqipc_t;
)
# smd may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_smd_t, polaris_bt_logger_smd_mqipc_t, bt_logger_smd)
)

polaris_lfts_dev_use(polaris_smd_t)

allow polaris_smd_t self:capability { sys_resource net_bind_service };

polaris_socketat_nsfs_read(polaris_smd_t)

```

```

allow polaris_smd_t self:process setrlimit;

corenet_tcp_bind_polaris_smd_devshell_port(polaris_smd_t)
corenet_tcp_bind_generic_node(polaris_smd_t)
allow polaris_smd_t self:tcp_socket { getattr setopt getopt bind create listen accept connect read write
name_connect };
allow polaris_smd_t self:capability { net_admin sys_admin };

allow polaris_smd_t self:udp_socket { create_socket_perms recv_msg send_msg };
#smutil_msg_event_cb_handler() uses netlink
allow polaris_smd_t self:netlink_socket { bind create };

# LOOK AT ME: now smd may open arbitrary port on forwarding VRF (16)
# but in SELinux there is no way to differentiate between port spaces
# accross VRFs or namespaces. For now let's grant smd_t access to all ports
# regardless of VRF. In future investigate ways to be more restrictive
corenet_udp_bind_generic_port(polaris_smd_t)
corenet_udp_sendrecv_generic_port(polaris_smd_t)
# LOOK AT ME: grants access to udp_bind on any node, but if we can
# be more specific and bind only to forwarding VRF related interfaces
corenet_udp_bind_generic_node(polaris_smd_t)

# smd want to listent on http port 80 on VRF_FWD, for webauth code please see
# smd/webauth/src/webauth_io.c
corenet_tcp_bind_http_port(polaris_smd_t)

allow polaris_smd_t self:capability dac_override;

logging_send_syslog_msg(polaris_smd_t)

allow polaris_smd_t self:capability net_raw;
allow polaris_smd_t self:packet_socket { create_socket_perms recv_msg send_msg };

# for access to disk html files (for webauth)
polaris_persistent_read(polaris_smd_t)

# transition for dc_profile_dir to polaris_smd_disk_t
gen_require(
    type initrc_t;
)
polaris_bootflash_filetrans(initrc_t, polaris_smd_disk_t, dir, "dc_profile_dir")

# SANET is listening on http port(CSCvb41802)
# Hence, it needs to follow the same rule as nginx is using in polarisnginx.te
# FIXME: add interface to allow bind to port 1025-65535
corenet_tcp_bind_all_ports(polaris_smd_t)

polaris_issu_tmp_files_read(polaris_smd_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissmd.te

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#

/usr/binos/conf/cedge-tanman.sh -- gen\_context(system\_u:object\_r:polaris\_cedge\_tanman\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedgetanman.fc

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#

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#

/usr/binos/conf/droputil.sh -- gen\_context(system\_u:object\_r:polaris\_droputil\_exec\_t,s0)

/tmp/rp/dropbox(/.\*)? gen\_context(system\_u:object\_r:polaris\_droputil\_tmp\_t,s0)

/tmp/rp/droputil(/.\*)? gen\_context(system\_u:object\_r:polaris\_droputil\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdroputil.fc

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#

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#

policy\_module(polarisvman, 1.0);

gen\_require(`

type polaris\_vman\_t;

`)

polaris\_btrace\_data\_manage(polaris\_vman\_t)

```
polaris_crft_data_manage(polaris_vman_t)
polaris_chasfs_manage(polaris_vman_t)
polaris_tdlresolve_read(polaris_vman_t)
polaris_tdlldb_list_dirs(polaris_vman_t)
polaris_cpld_read(polaris_vman_t)
polaris_flashlib_read(polaris_vman_t)

polaris_ripc_sman_ui_serv_connect(polaris_vman_t)

polaris_db_tdlldb_dir_use(polaris_vman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_vman_t)

polaris_rmonbifo_tmp_read(polaris_vman_t)
polaris_boot_tmp_read(polaris_vman_t)

logging_send_syslog_msg(polaris_vman_t)

modutils_read_module_deps(polaris_vman_t)
modutils_read_module_config(polaris_vman_t)
modutils_manage_module_config(polaris_vman_t)
modutils_domtrans_insmod(polaris_vman_t)
files_read_kernel_modules(polaris_vman_t)

corecmd_exec_bin(polaris_vman_t)
corecmd_exec_shell(polaris_vman_t)

# ifconfig related, ifconfig is executed in its own context
sysnet_domtrans_ifconfig(polaris_vman_t)

# VMAN calls vman_set_congestion_control_multiplex when the count
# of the bridge users reaches 2 and needs write permissions on
# contdev_multiplex
dev_rw_sysfs(polaris_vman_t)
fs_getattr_xattr_fs(polaris_vman_t)

virt_stream_connect(polaris_vman_t)
virt_read_pid_files(polaris_vman_t)

fs_rw_cgroup_files(polaris_vman_t)
kernel_read_system_state(polaris_vman_t)
# allow vman to read /dev/pts/*
term_use_generic_ptys(polaris_vman_t)
#allow polaris_vman_t polaris_udev_tmp_files_t:file open;
polaris_udev_tmp_read(polaris_vman_t)
#allow vman to run brctl in it's own domain
brctl_domtrans(polaris_vman_t)
```

```

#allow vman to run /sbin/fsck in script
fstools_domtrans(polaris_vman_t)
#allow vman to mount rootfs on polaris_disk_vman_t
allow polaris_vman_t polaris_disk_vman_t:dir mounton;
fs_mount_xattr_fs(polaris_vman_t)
#allow vman have capability for modify owner of the file
allow polaris_vman_t self:capability { chown fowner fsetid };
#allow vman to bind to unreserved tcp ports while it searches for
#port available to guest console to listen on
corenet_tcp_bind_unreserved_ports(polaris_vman_t)

# working with vman /var/ files
type polaris_var_vman_t;
files_tmp_file(polaris_var_vman_t)
files_var_filetrans(polaris_vman_t, polaris_var_vman_t, dir, "virtual-instance")
manage_files_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)
manage_dirs_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)
manage_sock_files_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)

# working with vman persitsten files
type polaris_disk_vman_t;
polaris_disk_type(polaris_disk_vman_t)

gen_require(`
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
`)
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, dir,
"virtual-instance")
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, file,
"virtual-instance.conf")
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, dir,
"vman_fdb")

# allow creation of /bootflash/virtual-instance.conf file
manage_files_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t)
# allow creation of /bootflash/virtual-instance and /bootflash/vman_fdb directories
manage_dirs_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t)
# vman can manage files inside of its own polaris_disk_vman_t directories
manage_files_pattern(polaris_vman_t, polaris_disk_vman_t, polaris_disk_vman_t)

# after all above transition we need to grant vman right to work with any
# persistent storage file since it needs to access and write .ova files
polaris_persistent_manage(polaris_vman_t)

# vman uses netlink socket to talk to lxc watchdog driver
# please see binos/vman/src/vman_lxc_wd.c
allow polaris_vman_t self:netlink_generic_socket { create_socket_perms sendto recvfrom};

```

```

# vman calls tipc-config which in turns wants to create AF_TIPC socket
allow polaris_vman_t self:socket create_socket_perms;

# vman uses 'ip netns exec 0 ifconfig -a' command which in turns switches
# network namespace and need access to /proc/pid/ns/net file
fs_read_nsfs_files(polaris_vman_t)

# this label is created to exchange log related information between container and host.
type polaris_vman_log_t;
# By making this label belong to polaris persistent storage combined with vman inheriting rights
# to manage polaris_disk via polaris_persistent_manage(), vman gains rights to manage below dirs.
polaris_disk_type(polaris_vman_log_t)
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdIpsAlert-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdUrlf-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdAmp-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdTls-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdLogMappings-IOX" )
allow polaris_vman_t polaris_vman_log_t:dir mounton;

# Allow vman to work with /bootflash/virtual-instance/UTD/rootfs
optional_policy(
    gen_require(
        type container_file_t;
    )
    allow polaris_vman_t container_file_t:filesystem { getattr unmount };
)

# Allow vman/ioxman to work with /tmp/HTX-IOX
optional_policy(
    gen_require(
        type polaris_htx_iox_tmp_t;
    )
    allow polaris_vman_t polaris_htx_iox_tmp_t:dir { getattr mounton open read };
)

# Allow vman to mount /tmp/binos-IOX
optional_policy(
    gen_require(
        type polaris_qfp_memif_t;
    )
    allow polaris_vman_t polaris_qfp_memif_t:dir mounton;
)

# vman_init.sh operates on /tmp/vman files
type polaris_vman_tmp_t;
files_tmp_file(polaris_vman_tmp_t)
files_tmp_filetrans(polaris_vman_t, polaris_vman_tmp_t, { file dir })

```

```

polaris_systemd_tmpfiles_tmp_filetrans(polaris_vman_tmp_t, dir, "vman")
manage_files_pattern(polaris_vman_t, polaris_vman_tmp_t,polaris_vman_tmp_t)
manage_dirs_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_tmp_t)

# allow vman to work with /tmp/xml
fs_remount_tmpfs(polaris_vman_t)
fs_unmount_tmpfs(polaris_vman_t)
fs_unmount_xattr_fs(polaris_vman_t)
allow polaris_vman_t polaris_vman_tmp_t:dir mounton;
optional_policy(
    polaris_cedge_xml_tmp_manage(polaris_vman_t)
)

# relabel /bootflash/virtual-instance/UTD/tmpstaging to /dev/loopX
gen_require(
    type iso9660_t;
)
allow polaris_vman_t iso9660_t:filesystem { relabelfrom };

# configure /proc/sys/net/ipv4/conf/dpbr_0/arp_announce
kernel_search_network_sysctl(polaris_vman_t)
kernel_rw_net_sysctls(polaris_vman_t)
#configure e.g. /proc/sys/vm/nr_hugepages
kernel_rw_vm_sysctls(polaris_vman_t)

# need to do bind mount of /bootflash/SHARED-IOX
mount_domtrans(polaris_vman_t)

# vman accessing files under /tmp created by initrc like /tmp/gdev/md0/gdev-info
init_read_script_tmp_files(polaris_vman_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_vman_t)

polaris_tmp_tdlldb_persist_setup(polaris_vman_t)

gen_require(
    type initrc_t;
)
files_tmp_filetrans(initrc_t, polaris_vman_tmp_t, file, "cgroup.log")

dmidecode_domtrans(polaris_vman_t)

# read /etc/libvirt/libvirt.conf
virt_read_config(polaris_vman_t)

# vman_cgroup_yaml.sh through prep_csr_kumo (binos_functions-pd) checks for
# ovf-env.xml file existence in variety of directories includind

```

```

# /cdrom0/ovf-env.xml
fs_read_iso9660_files(polaris_vman_t)

# allow vman to manage loop device: finding free /dev/loopN device
# note vman code iterated over all /dev/loop* devices and try to lock
# them. As part of that iteration it tries /dev/loop_control
# what it should do instead is to use /dev/loop_control to get free
# device
dev_rw_loop_control(polaris_vman_t)

# PLEASE LOOK AT ME
# allow vman to read, write /dev/loopN devices that are
# under fixed_disk_device_t label. It is pretty strong premission
# and at this point it is only done for /dev/loopN devices.
# Can we do better? i.e move /dev/loopN to some other label?
storage_manage_fixed_disk(polaris_vman_t)

# when /bootflash or /harddisk are 100% full
allow polaris_vman_t self:capability sys_resource;

# allow VMAN to move disk.img to the disk
allow polaris_vman_t self:process setfscreate;

# vman mounts directories on behalf of guest containers, it uses
# specified context for guest directories, need permission to
# relabel, mount, etc.
fs_relabelfrom_xattr_fs(polaris_vman_t)
virt_relabel_sandbox_filesystem(polaris_vman_t)
virt_mouton_sandbox_file(polaris_vman_t)
virt_manage_sandbox_files(polaris_vman_t)
gen_require(
    type svirt_sandbox_file_t;
)
allow polaris_vman_t svirt_sandbox_file_t:filesystem mount;

# /tmp/.flashlock operations from tdllib_startup_cfg_ignored, mcp_getmonvar
allow polaris_vman_t self:capability dac_override;

# allow vman to stat /dev/kvm, executed by vman_common_init function
dev_getattr_kvm_dev(polaris_vman_t)

# vman in getfs_info_by_mediatype function inspects files in /tmp/gdev
gen_require(
    type udev_tmp_t;
)
read_files_pattern(polaris_vman_t, udev_tmp_t, udev_tmp_t)

# /usr/binos/conf/vman_exec.sh policy

```

```

polaris_utility_domain_template(vman_shell)

polaris_bexecute_domain(polaris_vman_shell_t, polaris_vman_shell_exec_t)
# vman_exec.sh calls mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_vman_shell_t)
# mcp_chvrf.sh calls vman_exec.sh back and then it call bexec.sh
polaris_bexecute_domtrans(polaris_vman_shell_t)
corecmd_exec_bin(polaris_vman_shell_t)

# inherits stdin from telnetd
telnet_use_ptys(polaris_vman_shell_t)
#allow use of ptys for vman tech support
telnet_use_ptys(polaris_vman_tech_t)

optional_policy(`
# reads /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_vman_t)
`)

# vman_is_machine_type_initialized clone needs cap_userns sys_admin
allow polaris_vman_t self:cap_userns sys_admin;

# vman_cgroup_yaml.sh searches for ovf-env.xml on cdrom0
fs_read_removable_files(polaris_vman_t)

# vman starts vman_init.sh that in turns calls virsh
gen_require(`
    type virsh_t;
    type virsh_exec_t;
`)
domtrans_pattern(polaris_vman_t, virsh_exec_t, virsh_t)

polaris_bexecute_domtrans(polaris_vman_t)
polaris_send_signal_to_bexecute(polaris_vman_t)

gen_require(`
    type polaris_chvrf_t;
`)
# inherited as stdin/sdtout from vman
polaris_vman_use_fifo(polaris_chvrf_t)

# vman calls code_sign_verify VmanPackage
polaris_code_verify_domtrans(polaris_vman_t)

# vm_net_dev_utilization reads /proc/2962/net/dev
kernel_read_network_state(polaris_vman_t)

```

```

polaris_iosd_vcpu_read(polaris_vman_t)

# /usr/binos/conf/cgroup_reports.sh
polaris_utility_domain_template(cgroup_reports)

polaris_bexecute_domain(polaris_cgroup_reports_t, polaris_cgroup_reports_exec_t)
polaris_bexecute_domtrans(polaris_cgroup_reports_t)
# inherited as stdin/sdtout from vman
polaris_vman_use_fifo(polaris_cgroup_reports_t)

corecmd_exec_bin(polaris_cgroup_reports_t)
auth_use_nsswitch(polaris_cgroup_reports_t)

fs_read_cgroup_files(polaris_cgroup_reports_t)
fs_list_cgroup_dirs(polaris_cgroup_reports_t)

# cgroup_reports.sh creates misc files under /tmp
type polaris_cgroup_reports_tmp_t;
files_type(polaris_cgroup_reports_tmp_t)
files_tmp_filetrans(polaris_cgroup_reports_t, polaris_cgroup_reports_tmp_t, file)
manage_files_pattern(polaris_cgroup_reports_t, polaris_cgroup_reports_tmp_t, polaris_cgroup_reports_tmp_t)
fs_getattr_tmpfs(polaris_cgroup_reports_t)

# /usr/binos/conf/vman_techsupport.sh
polaris_utility_domain_template(vman_tech)

polaris_bexecute_domain(polaris_vman_tech_t, polaris_vman_tech_exec_t)
polaris_bexecute_domtrans(polaris_vman_tech_t)
# inherited as stdin/sdtout from vman
polaris_vman_use_fifo(polaris_vman_tech_t)

# vman_techsupport.sh starts virsh -c qemu:///system list --all
gen_require(`
    type virsh_t;
    type virsh_exec_t;
`)
domtrans_pattern(polaris_vman_tech_t, virsh_exec_t, virsh_t)

# starts ip link show
sysnet_domtrans_ifconfig(polaris_vman_tech_t)

# starts brctl show
brctl_domtrans(polaris_vman_tech_t)

corecmd_exec_bin(polaris_vman_tech_t)
auth_use_nsswitch(polaris_vman_tech_t)

polaris_proc_rmonbifo_read(polaris_vman_tech_t)

```

```

polaris_chasfs_read(polaris_vman_tech_t)
polaris_cpld_read(polaris_vman_tech_t)

# starts ps aux
kernel_read_system_state(polaris_vman_tech_t)
domain_read_all_domains_state(polaris_vman_tech_t)
dev_read_sysfs(polaris_vman_tech_t)
# getattr of stdin/stdout of misc processes
term_getattr_unallocated_ttys(polaris_vman_tech_t)
term_read_console(polaris_vman_tech_t)

# reads /bootflash/virtual-instance/
polaris_disk_vman_read(polaris_vman_tech_t)

# find /etc/libvirt/lxc -name *.xml -print
virt_read_config(polaris_vman_tech_t)
# no interface that lists virt_etc_rw_t dir
gen_require(
    type virt_etc_rw_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_etc_rw_t, virt_etc_rw_t)

# find /var/run/libvirt -name *.xml -maxdepth 2 -print
virt_read_pid_files(polaris_vman_tech_t)
# no interface that lists virt_var_run_t dir
gen_require(
    type virt_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_var_run_t, virt_var_run_t)
# no interface that lists virt_lxc_var_run_t dir
gen_require(
    type virt_lxc_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_lxc_var_run_t, virt_lxc_var_run_t)
# no interface that lists qemu_var_run_t dir
gen_require(
    type qemu_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, qemu_var_run_t, qemu_var_run_t)
#allow read of /run/libvirt/qemu
read_files_pattern(polaris_vman_tech_t, qemu_var_run_t, qemu_var_run_t)

# by some strange reason /var/run/libvirt/network is under dnsmasq_var_run_t label
dnsmasq_read_pid_files(polaris_vman_tech_t)
# no interface that lists dnsmasq_var_run_t dir
gen_require(
    type dnsmasq_var_run_t;
)

```

```

list_dirs_pattern(polaris_vman_tech_t, dnsmasq_var_run_t, dnsmasq_var_run_t)

polaris_vman_var_read(polaris_vman_tech_t)

# cat /proc/net/dev
kernel_read_network_state(polaris_vman_tech_t)

# find /sys/class/net -name intsvc* -type d -print
dev_list_sysfs(polaris_vman_tech_t)

# grep over /varied/ovf-env.xml
polaris_disk_varied_read(polaris_vman_tech_t)

# writes into /tmp/vman_techsupport
polaris_vman_tmp_manage(polaris_vman_tech_t)

# find over /sys/fs/cgroup/memory/machine
fs_list_cgroup_dirs(polaris_vman_tech_t)
# cat /sys/fs/cgroup/memory/machine/memory.limit_in_bytes
fs_read_cgroup_files(polaris_vman_tech_t)

# runs df command
fs_getattr_xattr_fs(polaris_vman_tech_t)
fs_getattr_all_fs(polaris_vman_tech_t)
files_getattr_all_dirs(polaris_vman_tech_t)
# getattr over /run/netns/2
fs_read_nsfs_files(polaris_vman_tech_t)

# check existence of vman btrace file before passing it to btdecode
polaris_vman_bt_getattr(polaris_vman_tech_t)
# check existence of pman btrace file for vman before passing it to btdecode
polaris_pman_bt_getattr(polaris_vman_tech_t)

# vman_techsupport.sh creates misc files under /tmp
type polaris_vman_tech_tmp_t;
files_type(polaris_vman_tech_tmp_t)
files_tmp_filetrans(polaris_vman_tech_t, polaris_vman_tech_tmp_t, file)
manage_files_pattern(polaris_vman_tech_t, polaris_vman_tech_tmp_t, polaris_vman_tech_tmp_t)

#allow vman tech support to read container logs including listing dirs
gen_require(
    type virt_log_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_log_t, virt_log_t)
virt_read_log(polaris_vman_tech_t)

# allow vman to access /etc/passwd

```

```
auth_map_passwd(polaris_vman_shell_t)
```

```
#vman does lvm storage management e.g. vman_libvirt_strg_available_by_pool  
lvm_domtrans(polaris_vman_t)
```

```
#Allow read of pid files e.g. /run/udev/data/b7:34  
udev_read_pid_files(polaris_vman_t)
```

```
#allow vman to connect to the WAAS container for serial vman_register_socket  
polaris_waas_stream_connect(polaris_vman_t)
```

```
# allow vman to pgrep  
# allow to get getattr of /proc file system  
domain_read_all_domains_state(polaris_vman_t)
```

```
# allow vman to kill LXC container process that hasn't shutdown  
# inspite of a shutdown command  
gen_require(  
    type virtd_lxc_t;  
)  
polaris_vman_kill_process(virtd_lxc_t)
```

```
# allow vman to rsync using ioxman_syslib.sh  
rsync_entry_type(polaris_vman_t)  
corenet_tcp_connect_rsync_port(polaris_vman_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvman.te  
No license file was found, but licenses were detected in source scan.
```

```
#  
# March 2017, Victor Kamensky  
#  
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# All rights reserved  
#
```

```
/tmp/.ncsshd_authorized_keys(/.*)? gen_context(system_u:object_r:polaris_ncsshd_keys_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsd.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
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```

```

#

## <summary>Polaris Btrace Policy Rules.</summary>

#####
# Obfl policy
#####

#####
## <summary>
##   Read obfl files (under /obfl, /varied/obfl, etc)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_obfl_data_read`,`
gen_require(`
type polaris_obfl_data_t;
type root_t;
`)

read_lnk_files_pattern($1, root_t, polaris_obfl_data_t)
read_files_pattern($1, polaris_obfl_data_t, polaris_obfl_data_t)
list_dirs_pattern($1, polaris_obfl_data_t, polaris_obfl_data_t)
allow $1 polaris_obfl_data_t:file map;
`)

#####
## <summary>
##   Manage obfl files (under /obfl, /varied/obfl, etc)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_obfl_data_manage`,`
gen_require(`
type polaris_obfl_data_t;
type root_t;
type var_t;
`)

```

```

read_lnk_files_pattern($1, root_t, polaris_obfl_data_t)
manage_files_pattern($1, { var_t polaris_obfl_data_t }, polaris_obfl_data_t)
manage_dirs_pattern($1, { var_t polaris_obfl_data_t }, polaris_obfl_data_t)
allow $1 polaris_obfl_data_t:file map;
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisobfl.if
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris Btrace Policy Rules.</summary>

```

```

#####
# RPC policy
#####

```

```

#####
## <summary>
##   Work with ripc
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_ripc`,
  corenet_tcp_bind_generic_node($1)
  allow $1 self:tcp_socket { getattr setopt getopt bind create listen accept connect read write };
  # bipc would like to issue "setsockopt(sock, SOL_SOCKET, SO_VRF," which requires
  # net_admin and sys_admin capabilities
  allow $1 self:capability { net_admin sys_admin };

  polaris_socketat_nsfs_read($1)
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisripc.if

```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

/tmp/sw/boot(/.*)?      gen_context(system_u:object_r:polaris_boot_tmp_t,s0)
/tmp/sw/isos(/.*)?     gen_context(system_u:object_r:polaris_boot_tmp_t,s0)
/tmp/bootup_timestamp   gen_context(system_u:object_r:polaris_boot_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.fc

No license file was found, but licenses were detected in source scan.

```
#
# December 2019, Victor Kamensky
#
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#
```

# polarisservicemgr file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisservicemgr.fc

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

## <summary>Polaris polarisboothelper Policy Rules.</summary>

#####

```
## <summary>
##   Read any regular file/directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```

#
interface(`polaris_udev_tmp_read`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    read_files_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
    list_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
`)

#####
## <summary>
##   Manage any regular file/directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_udev_tmp_manage`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    manage_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
    manage_files_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
`)

#####
## <summary>
##   Listdir of any regular directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_udev_tmp_list_dirs`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    list_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
`)

#####
## <summary>
##   Watch udev_tmp_files directories and files
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_udev_tmp_watch`,`
gen_require(`
type polaris_udev_tmp_files_t;
`)
allow $1 polaris_udev_tmp_files_t:{dir file} watch;
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisboothelper.if
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
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#

```

```

/usr/cpp/bin/cpp_driver -- gen_context(system_u:object_r:polaris_cpp_driver_exec_t,s0)
/usr/cpp/bin/cpp_driver_ledp -- gen_context(system_u:object_r:polaris_cpp_driver_exec_t,s0)
/usr/cpp/bin/cpp_driver_us_ledp -- gen_context(system_u:object_r:polaris_cpp_driver_exec_t,s0)
/usr/cpp/bin/cpp_driver_vwlc -- gen_context(system_u:object_r:polaris_cpp_driver_exec_t,s0)
/usr/cpp/bin/cpp_driver_vwlc_ledp -- gen_context(system_u:object_r:polaris_cpp_driver_exec_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppdriver.fc
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
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#

```

```

/usr/binos/conf/mcp_monitor_process_batchmode.sh --
gen_context(system_u:object_r:polaris_monitor_process_exec_t,s0)
/usr/binos/conf/pkg_summary.sh -- gen_context(system_u:object_r:polaris_pkg_summary_exec_t,s0)
/usr/binos/conf/pkg_to_tree.sh -- gen_context(system_u:object_r:polaris_pkg_to_tree_exec_t,s0)

/tmp/myhostname gen_context(system_u:object_r:polaris_hm_tmp_t,s0)

```

```
/tmp/show_provision_temp(/.*)?          gen_context(system_u:object_r:polaris_show_provision_tmp_t,s0)
/tmp/fs_lock_bootflash                  gen_context(system_u:object_r:polaris_cli_fs_cmds_tmp_t,s0)
# used by "sh pla so filesystem bootflash: de" CLI
/usr/binos/conf/mcp_cli_fs_cmds.sh --   gen_context(system_u:object_r:polaris_cli_fs_cmds_exec_t,s0)
# used by "show platform software yang-management process monitor" CLI
/usr/binos/conf/mcp_monitor_dmi_proc.sh --
gen_context(system_u:object_r:polaris_monitor_dmi_process_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarishm.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Shawn Lu
#
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#
```

```
## <summary>Polaris odm Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Mqipc channel in sub directory and multiple servers on TDL
## channel is not supported by autogen code. ODM odm_clnt2svr_data
## channel is one of those. Allow domain to be one server on it.
## ODM elastic value is 2 now, add more if need in the future.
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
## <param name="mqipc_label">
```

```
##   <summary>
```

```
##   Mqipc channel file label.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_odm_clnt2svr_mqipc_create`,`
```

```
    gen_require(`
```

```
        type polaris_odm_client2server_data_mqipc_t;
```

```
    `)
```

```
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data-b1)
```

```
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data-b0)
```

```
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data)
```

```
    `)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodm.if

No license file was found, but licenses were detected in source scan.

#

# February 2020, Victor Kamensky

#

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#

## <summary>Polaris install\_mgr Policy Rules.</summary>

#####

## <summary>

## Read /tmp/sw/inst\_tmp\_1 files and directories

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_install\_mgr\_tmp\_read`,`

gen\_require(`

type polaris\_install\_mgr\_tmp\_t;

`)

list\_dirs\_pattern(\$1, polaris\_install\_mgr\_tmp\_t, polaris\_install\_mgr\_tmp\_t)

read\_files\_pattern(\$1, polaris\_install\_mgr\_tmp\_t, polaris\_install\_mgr\_tmp\_t)

read\_lnk\_files\_pattern(\$1, polaris\_install\_mgr\_tmp\_t, polaris\_install\_mgr\_tmp\_t)

`)

#####

## <summary>

## Read/Write /.installer files and directories

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_install\_disk\_manage`,`

gen\_require(`

type polaris\_disk\_bootflash\_t;

type polaris\_disk\_install\_t;

`)

```

filetrans_pattern(polaris_install_mgr_t,polaris_disk_bootflash_t, polaris_disk_install_t, dir, ".installer")
filetrans_pattern(polaris_install_mgr_t,polaris_disk_bootflash_t, polaris_disk_install_t, fifo_file, "inot_fifo")
manage_dirs_pattern($1, {polaris_disk_bootflash_t polaris_disk_install_t}, polaris_disk_install_t)
manage_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
manage_fifo_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
)

```

```
#####
```

```

## <summary>
##   Read /bootflash/.installer files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_disk_read`,`
  gen_require(`
    type polaris_disk_install_t;
  `)

```

```

  read_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
)

```

```
#####
```

```

## <summary>
##   Read copylog files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_read_user_file`,`
  gen_require(`
    type polaris_user_file_t;
    type device_t;
  `)

```

```

  read_blk_files_pattern($1, device_t, polaris_user_file_t)
  read_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
  read_lnk_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
)

```

```
#####
```

```

## <summary>
##  getattr for copylog files (location varies by platform)
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed access.
##  </summary>
## </param>
## <rolebase/>
#
interface(`polaris_user_file_getattr`,`
    gen_require(`
        type polaris_user_file_t;
        type device_t;
    `)

    getattr_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.if
No license file was found, but licenses were detected in source scan.

```

```

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#

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisjvm.fc
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```

```

dnl
dnl April 2018, Victor Kamensky
dnl
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dnl
dnl Crankshaft (Overlord, Utah, Goldbeach, Neptune, TSN and Supernova) Platform Max Bay Limits
max_bay_map_set(`rp`, `per_bay`, 0)
max_bay_map_set(`cc`, `per_bay`, 19)
max_bay_map_set(`fp`, `per_bay`, 0)

max_bay_ripc_map_set(`rp`, `per_bay`, 0)
max_bay_ripc_map_set(`cc`, `per_bay`, 19)
max_bay_ripc_map_set(`fp`, `per_bay`, 0)

```

```
max_bay_ripc_map_set(`rp', `global', 0)
max_bay_ripc_map_set(`cc', `global', 19)
max_bay_ripc_map_set(`fp', `global', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/crankshaftmaps.m4
```

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```
#
```

```
# February 2020, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/usr/bin/vconfd_script_reboot\.sh -- gen_context(system_u:object_r:polaris_vconfd_reboot_exec_t,s0)
/usr/bin/vconfd_script_if_reset\.sh -- gen_context(system_u:object_r:polaris_vconfd_ifreset_exec_t,s0)
/usr/bin/vconfd_script_get_config\.sh -- gen_context(system_u:object_r:polaris_vconfd_cfg_exec_t,s0)
/usr/bin/vconfd_script_vmanage_list_stats\.sh --
gen_context(system_u:object_r:polaris_vconfd_history_exec_t,s0)
/usr/bin/vconfd_script_vmanage_clear_stats\.sh --
gen_context(system_u:object_r:polaris_vconfd_history_exec_t,s0)
/usr/bin/vconfd_script_activate\.sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/mcp_upgrade_wrapper\.sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/vconfd_script_nms_action\.sh -- gen_context(system_u:object_r:polaris_vconfd_nms_exec_t,s0)
/usr/bin/vconfd_script_add_chassis_numbers_to_ztp\.sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/vconfd_script_remove_chassis_numbers_from_ztp\.sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/vconfd_script_upload_chassis_number_file\.sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/reset-conf -- gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)
/usr/bin/reset-logs -- gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)
/usr/bin/patch\.sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/vconfd_script_reset_vsmart_serial_list\.sh --
gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)

/usr/bin/vconfd_script_cert\.sh -- gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_show_cert\.sh -- gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_show_root_ca_cert\.sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_upload_root_ca_cert_chain\.sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_uninstall_root_ca_cert_chain\.sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_tlsproxy_install_certs\.sh --
```

```

gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_tlsproxy_remove_certs\sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)

/usr/bin/vconfd_script_csr\sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_show_csr\sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_sign_csr\sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_upload_vsmart_serial_numbers\sh --
gen_context(system_u:object_r:polaris_vconfd_serialnum_exec_t,s0)
/usr/bin/vconfd_script_upload_vedge_serial_numbers\sh --
gen_context(system_u:object_r:polaris_vconfd_serialnum_exec_t,s0)
/usr/bin/vconfd_script_fetch_core_info\sh -- gen_context(system_u:object_r:polaris_vconfd_crash_exec_t,s0)
# admin-tech scripts skipped defined in some other place
/usr/bin/list_crashtech_files\sh -- gen_context(system_u:object_r:polaris_vconfd_crash_exec_t,s0)
/usr/bin/vconfd_script_unlock_user\sh -- gen_context(system_u:object_r:polaris_vconfd_aaa_exec_t,s0)
/usr/bin/vconfd_script_set_password\sh -- gen_context(system_u:object_r:polaris_vconfd_aaa_exec_t,s0)
/usr/bin/vconfd_script_container\sh -- gen_context(system_u:object_r:polaris_vconfd_contr_exec_t,s0)
/usr/bin/polaris_iox_precheck\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_install\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_upgrade\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_uninstall\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_reset\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_postcheck\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_download\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_remove\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_activate\sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_utd_sigupdate\sh -- gen_context(system_u:object_r:polaris_vconfd_utd_exec_t,s0)
/usr/bin/polaris_geo_db_update\sh -- gen_context(system_u:object_r:polaris_vconfd_geo_exec_t,s0)
/usr/bin/vconfd_script_vping\sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)
/usr/bin/vconfd_script_vnping\sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)
/usr/bin/vconfd_script_vtraceroute\sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedge.fc

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```

#
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#

```

policy\_module(polaristdlresolve, 1.0);

```

#####
# TDLresolve policy
#####

```

```

gen_require(
    attribute polaris_extended_domain;
)

type polaris_tdlresolve_t;
files_type(polaris_tdlresolve_t)

files_tmp_filetrans(polaris_extended_domain, polaris_tdlresolve_t, dir, "tdlresolve")
# tdl_boottime.sh uses /tmp/tdlresolve_tmp for some temp files
# which are moved into /tmp/tdlresolve latter
files_tmp_filetrans(polaris_extended_domain, polaris_tdlresolve_t, dir, "tdlresolve_tmp")

type polaris_global_service_t;
files_type(polaris_global_service_t);

#####
# rsync policy
#####
gen_require(
    type rsync_t;
    type polaris_btrace_base_t;
)
#tdl_cleanup_epochs.sh uses btrace
allow rsync_t polaris_btrace_base_t:file map;
#rsync invokes tdl_cleanup_epochs.sh as part of this set /proc/[pid]/oom_score_adj is done
allow rsync_t self:capability sys_resource;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristdlresolve.te
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#
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#
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#

policy_module(polarisqfp, 1.0);

polaris_process_domain_template(qfp)

polaris_cpp_process(polaris_qfp_t)
polaris_cpp_dev_use(polaris_qfp_t)
polaris_btrace_data_manage(polaris_qfp_t)
polaris_crft_data_manage(polaris_qfp_t)
polaris_chasfs_manage(polaris_qfp_t)
polaris_lsmpi_dev_use(polaris_qfp_t)

```

```

polaris_persistent_list_dirs(polaris_qfp_t);

# allow for hot add on azure
kernel_read_irq_sysctls(polaris_iodbd_t)
kernel_rw_irq_sysctls(polaris_iodbd_t)

# allow read variety of system information from sysfs, as well as write
# into configuration of some pcie devices
# type=AVC msg=audit(1479597040.739:218): avc: denied { write } for pid=30997 comm="ucode_ctl_rx"
name="config" dev="sysfs" ino=22363 scontext=system_u:system_r:polaris_qfp_t:s0
tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_rw_sysfs(polaris_qfp_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_qfp_t)

# allow access to uio devices like /dev/ui0
dev_rw_userio_dev(polaris_qfp_t)

# Platforms with QAT v1.7 need map permission also
# qae device (/dev/icp_adf_ctl)
type polaris_icp_device_t;
dev_node(polaris_icp_device_t)

allow polaris_qfp_t userio_device_t:chr_file map;

# allow to read /proc/meminfo
kernel_read_system_state(polaris_qfp_t)

# qfp FIA (Feature Invocation Array) resides in /dev/shm/cpp_ucode_dram
# Those are set of instructions assembled by cpp control plane and passed
# to qfp to execute.
polaris_cpp_tmpfs_exec(polaris_qfp_t)

# qfp /var/run pid file
type polaris_qfp_var_run_t;
files_pid_file(polaris_qfp_var_run_t)
manage_files_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)
manage_dirs_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)
files_pid_filetrans(polaris_qfp_t, polaris_qfp_var_run_t, { file dir })
# mmap /var/run/dpdk/rte/config
allow polaris_qfp_t polaris_qfp_var_run_t:file map;

# qfp memif directory and file
type polaris_qfp_memif_t;
files_tmp_file(polaris_qfp_memif_t);
# qfp memif interface for binos clients in /tmp/memif
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_memif_t, dir, "memif")

```

```

# creates /tmp/binos-IOX/memif
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_memif_t, dir, "binos-IOX")
polaris_qfp_memif_manage(polaris_qfp_t)
# qfp memif interface for container in /bootflash/SHARED-IOX/memif
polaris_disk_type(polaris_qfp_memif_t)
gen_require(`
    type polaris_disk_bootflash_t;
`)
filetrans_pattern(polaris_qfp_t, polaris_disk_bootflash_t, polaris_qfp_memif_t, dir, "memif")

# work with /bootflash/SHARED-IOX/memif/memif-dp-svr
polaris_utdl_container_dgram_send(polaris_qfp_t)

# work (create/open/read/write) with hugetlbs files
fs_manage_hugetlbs_dirs(polaris_qfp_t)
fs_rw_hugetlbs_files(polaris_qfp_t)
gen_require(`
    type hugetlbs_t;
`)
allow polaris_qfp_t hugetlbs_t:file create;
# dpdk may unlinks unneeded pages in unmap_unneeded_hugepages function
allow polaris_qfp_t hugetlbs_t:file unlink;

allow polaris_qfp_t self:capability { sys_rawio sys_nice sys_admin };
allow polaris_qfp_t self:process setsched;

# is_nic_netmap_capable function, which is used by vnic_cfg_port, needs socket to
# work with interface parameters
allow polaris_qfp_t self:udp_socket create_socket_perms;

ifdef(`crankshaft_family',`
polaris_icc_broken_relocations(polaris_qfp_t)
`)

# access to /dev/dash_xxx devices on cranshaft platforms
optional_policy(`
    polaris_dash_dev_use(polaris_qfp_t)
`)

# netmap device (/dev/netmap)
type polaris_netmap_device_t;
dev_node(polaris_netmap_device_t)

polaris_netmap_dev_use(polaris_qfp_t)

# access to /dev/icp_XXX device on crankshaft platforms
optional_policy(`
    polaris_icp_dev_use(polaris_qfp_t)
`)

```

```

)

# netmap device (/dev/svc_eng_puntNN)
type polaris_sep_device_t;
dev_node(polaris_sep_device_t)

polaris_svc_eng_punt_dev_use(polaris_qfp_t)

# transition and access to /var/log/cdal-tsn-info.log
ifdef(^tsn_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
)

# transition and access to /var/log/cdal-tsn-info.log
ifdef(^blackheart_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
)

# aventus needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
# transition and access to /var/log/cdal-tsn-info.log
ifdef(^aventus_platform',`
gen_require(
    type syslogd_t;
)
polaris_qfp_log_manage("cdal-tsn-info.log")
polaris_ggpio_dev_read_write(polaris_qfp_t)
polaris_ggpio_dev_read_write(syslogd_t)
)

# transition and access to /var/log/cdal-tsn-info.log
ifdef(^cabo_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
)

# transition and access to /var/log/cdal-tsn-info.log
ifdef(^supernova_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
)

# LOOK AT ME: qfp process links libcrypto.so.1.0.0 which has DT_TEXTREL
# that should be addressed by CSCvj99896, once that is fixed remove below
# under CSCvj99905.
gen_require(
    type lib_t;
)

allow polaris_qfp_t lib_t:file execmod;

```

```

# LOOK AT ME: qfp process on TSN LE has executable stack with GNU_STACK marked RWE
# that should be addressed by CSCvk66808, once that is fixed remove below
# under CSCvk66832.
#ifdef(^tsn_platform',`
allow polaris_qfp_t self:process execmem;
')

# lsmapi replacement punt/inject over domain sockets
polaris_pi_uds_manage(polaris_qfp_t)
polaris_iosd_dgram_send(polaris_qfp_t)

# dpdk code reads CPU model specific register (MSR)
dev_read_cpuid(polaris_qfp_t)

# dpdk code in rte_mp_channel_init function creates and works
# with /var/run/dpdk/rte/mp_socket socket
manage_sock_files_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)

# dpdk code in dev_uev_socket_fd_create creates and work with
# netlink_kobject_uevent_socket socket
# Note: radium with QAT v1.7 requires getattr and setopt
allow polaris_qfp_t self:netlink_kobject_uevent_socket { getattr setopt bind create };

# hal_random32_init calls hw_random32_init and it opens /dev/random
dev_read_rand(polaris_qfp_t)

gen_require(
    type sysfs_t;
)
mmap_files_pattern(polaris_qfp_t, sysfs_t, sysfs_t)

# LOOK AT ME: remove after CSCvs34007 fixed
# qfp runs hidendir hide /bootflash/SHARED-IOX/memif
corecmd_exec_bin(polaris_qfp_t)
corecmd_exec_shell(polaris_qfp_t)
auth_use_nsswitch(polaris_qfp_t)

# CSR & C8KV use infiniband and tun/tap devices for Azure
type polaris_infiniband_device_t;
dev_node(polaris_infiniband_device_t)

polaris_infiniband_dev_use(polaris_qfp_t)

kernel_request_load_module(polaris_qfp_t)
allow polaris_qfp_t self:netlink_rdma_socket { bind create setopt };
allow polaris_qfp_t self:capability { ipc_lock net_admin net_raw };
allow polaris_qfp_t self:netlink_route_socket rw_netlink_socket_perms;

```

```

allow polaris_qfp_t self:tun_socket { create relabelfrom relabelto };
corenet_rw_tun_tap_dev(polaris_qfp_t)

# CSR Azure IO model requies read access
gen_require(
    type proc_net_t;
)
allow polaris_qfp_t proc_net_t:file { read };

# manange MLX NIC socket files in /var/tmp/net_mlx5*
type polaris_qfp_var_tmp_t;
files_tmp_file(polaris_qfp_var_tmp_t);
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_var_tmp_t, { sock_file })
manage_sock_files_pattern(polaris_qfp_t, polaris_qfp_var_tmp_t, polaris_qfp_var_tmp_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_xattr_fs(polaris_qfp_t)

# allow create of dir /bootflash/SHARED-IOX on first install of VM
create_dirs_pattern(polaris_qfp_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t)

polaris_cpld_read(polaris_qfp_t, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)

# tsn needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
ifdef(^tsn_platform',`
    polaris_ggpio_dev_read_write(polaris_qfp_t)
)

# blackheart needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
ifdef(^blackheart_platform',`
    polaris_ggpio_dev_read_write(polaris_qfp_t)
)

# sparrow needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
# Also needs access to cdal-tsn-info.log
ifdef(^sparrow_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
    polaris_ggpio_dev_read_write(polaris_qfp_t)
)

# ucode also needs access to ttyUSB4
ifdef(^cabo_platform',`
    term_use_usb_ttys(polaris_qfp_t)
)

```

```

# qfp starts /usr/binos/bin/net_hotremove-vxe.sh
init_read_script_files(polaris_qfp_t)

# access to /dev/dash_XXX devices on cranshaft platforms
optional_policy(
    polaris_htx_dgram_send(polaris_qfp_t)
)

# net_hotremove-vxe.sh that works with /tmp/iodb
polaris_iodb_tmp_manage(polaris_qfp_t)
# net_hotremove-vxe.sh sends signal to iodbd.sh
gen_require(
    type polaris_iodbd_t;
)
allow polaris_qfp_t polaris_iodbd_t:process signal;
# net_hotremove-vxe.sh reads /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_qfp_t)

# long running helper script iodbd.sh
polaris_process_domain_template(iodbd)

# iodbd.sh started by /etc/init.d/binos that runs under initrc_t
gen_require(
    type initrc_t;
)
polaris_iodbd_domtrans(initrc_t)

polaris_boot_tmp_read(polaris_iodbd_t)
polaris_chasfs_manage(polaris_iodbd_t)
polaris_cpld_read(polaris_iodbd_t)
polaris_rmonbifo_tmp_read(polaris_iodbd_t)

auth_use_nsswitch(polaris_iodbd_t)
corecmd_exec_bin(polaris_iodbd_t)

# hot add interfaces virtio/sriov
dev_manage_sysfs_dirs(polaris_iodbd_t)
polaris_sysfs_manage(polaris_iodbd_t)

# write into sysfs file like /sys/devices/pci0000:00/0000:00:03.2/config
dev_rw_sysfs(polaris_iodbd_t)

# read/write /run/dpdk/rte/config
manage_files_pattern(polaris_iodbd_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)

# lspci reads /etc/modprobe.d

```

```

modutils_read_module_config(polaris_iodbd_t)
# lspci reads /lib/modules/5.4.40/modules.softdep
files_read_kernel_modules(polaris_iodbd_t)
files_map_kernel_modules(polaris_iodbd_t)

# runs dmidecode
dmidecode_domtrans(polaris_iodbd_t)
# dmidecode when run in this context needs access initrc stdin/stdout
gen_require(
    type dmidecode_t;
)
init_rw_stream_sockets(dmidecode_t)

# calls ethtool -i intsvc0
sysnet_domtrans_ifconfig(polaris_iodbd_t)

# reads /etc/rc.d/init.d/binos_functions-pd-iodb
init_read_script_files(polaris_iodbd_t)

# read /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_iodbd_t)

# cat /sys/class/net/intsvc0/address
dev_read_sysfs(polaris_iodbd_t)

# read /proc/cmdline
kernel_read_system_state(polaris_iodbd_t)

polaris_iodb_tmp_manage(polaris_iodbd_t)

type polaris_iodb_tmp_t;
files_tmp_file(polaris_iodb_tmp_t)

# /tmp/iodb is created by /etc/init.d/binos that runs under initrc_t
gen_require(
    type initrc_t;
)
files_tmp_filetrans(initrc_t, polaris_iodb_tmp_t, dir, "iodb")
polaris_iodb_tmp_manage(initrc_t)

# udev_t can drop entries into /tmpi/iodb to process
gen_require(
    type udev_t;
)
polaris_iodb_tmp_manage(udev_t)

# Radium and Thallium need to check rommon version when initializing static
# interface table (access /proc/rmonbifo).

```

```
optional_policy(  
    polaris_proc_rmonbifo_read(polaris_qfp_t)  
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisqfp.te

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```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
## <summary>Polaris cpp_ha Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppha.if

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```
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#
```

```
policy_module(polarisngwctblmgr, 1.0);
```

```
gen_require(  
    type polaris_ngwc_tbl_mgr_t;  
)
```

```
polaris_btrace_data_manage(polaris_ngwc_tbl_mgr_t)  
polaris_crft_data_manage(polaris_ngwc_tbl_mgr_t)  
polaris_chasfs_manage(polaris_ngwc_tbl_mgr_t)  
polaris_tdlresolve_read(polaris_ngwc_tbl_mgr_t)  
polaris_tdlldb_list_dirs(polaris_ngwc_tbl_mgr_t)  
polaris_cpld_read(polaris_ngwc_tbl_mgr_t)  
polaris_lua_read(polaris_ngwc_tbl_mgr_t)  
polaris_flashlib_read(polaris_ngwc_tbl_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_ngwc_tbl_mgr_t)
```

```
allow polaris_ngwc_tbl_mgr_t self:capability dac_override;
```

```
polaris_dyncfg_tmp_read(polaris_ngwc_tbl_mgr_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.te

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#

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#

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#

# polarisfmanrp file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.fc

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

define(^ polaris\_rpc\_service\_server\_aux',`dnl

polaris\_rpc\_\$2\_bind(\$3)

polaris\_rpc(\$3)

')

define(^ polaris\_rpc\_service\_server\_full',`dnl

polaris\_rpc\_service\_server\_aux(ripc\_label(\$1), ripc\_stem(\$1), process\_label(\$2))

')

define(^ polaris\_rpc\_service\_server',`dnl

ifelse(ripc\_type\_map(\$1), `', `polaris\_rpc\_service\_server\_full(\$1, \$2, \$3, \$4, \$5)')

ripc\_type\_map\_set(ripc\_label(\$1), process\_label(\$2))

')

define(^ polaris\_rpc\_service\_client\_aux',`dnl

polaris\_rpc(\$3)

polaris\_rpc\_\$2\_connect(\$3)

')

define(^ polaris\_rpc\_service\_client',`dnl

polaris\_rpc\_service\_client\_aux(ripc\_label(\$1), ripc\_stem(\$1), process\_label(\$2))dnl

')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_ripc\_te.m4

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#

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#

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#

/usr/binos/conf/audit\_log.sh -- gen\_context(system\_u:object\_r:polaris\_audit\_log\_exec\_t,s0)

/usr/binos/conf/audit\_snapshot.sh -- gen\_context(system\_u:object\_r:polaris\_audit\_log\_exec\_t,s0)

/tmp/package\_biv\_sums -- gen\_context(system\_u:object\_r:polaris\_kgv\_data\_t,s0)

/usr/bin/code\_sign\_verify -- gen\_context(system\_u:object\_r:polaris\_code\_verify\_exec\_t,s0)

/usr/sbin/boot\_verify\_package -- gen\_context(system\_u:object\_r:polaris\_code\_verify\_exec\_t,s0)

/usr/sbin/kgv\_update -- gen\_context(system\_u:object\_r:polaris\_code\_verify\_exec\_t,s0)

/dev/shm/sem\updatepcr8d\_msg\_sem gen\_context(system\_u:object\_r:polaris\_code\_verify\_tmpfs\_t,s0)

# /dev/aikido

/dev/aikido -c gen\_context(system\_u:object\_r:polaris\_aikido\_device\_t,s0)

/usr/binos/conf/mcp\_upgrade\_hwprg.sh gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_hwprg\_fpga.sh gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_hwprg\_cpld.sh gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_hwprg\_cmds.sh gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_hwprg\_utils.sh gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/bin/tam\_fw\_upgrade gen\_context(system\_u:object\_r:polaris\_hw\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_rommon.sh gen\_context(system\_u:object\_r:polaris\_rom\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_rommon\_cmds.sh gen\_context(system\_u:object\_r:polaris\_rom\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_rommon\_helper.sh gen\_context(system\_u:object\_r:polaris\_rom\_upgrade\_exec\_t,s0)

/usr/binos/conf/mcp\_upgrade\_rommon\_x86.sh gen\_context(system\_u:object\_r:polaris\_rom\_upgrade\_exec\_t,s0)

/dev/scansta -c gen\_context(system\_u:object\_r:polaris\_scansta\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristws.fc

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#

# June 2020, Cuiyan Ma

#

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#

policy\_module(polarisissucompcheck, 1.0);

```

polaris_process_domain_template(issu_comp_check)

corecmd_exec_bin(polaris_issu_comp_check_t)
corecmd_exec_shell(polaris_issu_comp_check_t)

polaris_chasfs_manage(polaris_issu_comp_check_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_issu_comp_check_t)

# For reading tracekey from /tmp/tmppub/tracekey_cache/usr/bin/rotee
polaris_btrace_tmppub_read(polaris_issu_comp_check_t)

# For reading /sys/devices/platform/cpld/platform_type
polaris_cpld_read(polaris_issu_comp_check_t)

# For reading /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_issu_comp_check_t)

# For ls on /tmp/ufs/crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_issu_comp_check_t)
`)

# work with /tmp files
type polaris_issu_comp_check_tmp_t;
files_tmp_file(polaris_issu_comp_check_tmp_t)
manage_dirs_pattern(polaris_issu_comp_check_t, tmp_t, polaris_issu_comp_check_tmp_t)
manage_files_pattern(polaris_issu_comp_check_t, polaris_issu_comp_check_tmp_t,
polaris_issu_comp_check_tmp_t)
files_tmp_filetrans(polaris_issu_comp_check_t, polaris_issu_comp_check_tmp_t, { file dir })

# For using push_using_rsync
polaris_chvrf_domtrans(polaris_issu_comp_check_t)

gen_require(`
    type rsync_t;
`)
rsync_entry_domtrans(polaris_issu_comp_check_t, rsync_t)
polaris_manage_rsync_tmpplog_dir(polaris_issu_comp_check_t)

# rsync inherits issu_comp_check.sh's stdout/stderr fifo files
allow rsync_t polaris_issu_comp_check_t:fifo_file write;

allow polaris_issu_comp_check_t self:capability sys_resource;

# reads /tmp/remote_sw_verinfo.txt
gen_require(`

```

```
    type rsync_tmp_t;
)
read_files_pattern(polaris_issu_comp_check_t, rsync_tmp_t, rsync_tmp_t)

# use of errmsg.sh
polaris_script_errmsg_use(polaris_issu_comp_check_t)

# hwutil modifies /sys/bus/i2c/drivers/pca9548/1-0076/reg_control
# TODO: label sysfs so that reg control gets its own label
dev_rw_sysfs(polaris_issu_comp_check_t)

# allow locking of /tmp/sysctrl_i2c.lck
# TODO: this file probably deserves its own label when created by cm_rp
polaris_cm_rp_tmp_manage(polaris_issu_comp_check_t)
```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.te

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```
#
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#
```

```
## <summary>Polaris dmi_opdatamgrd Policy Rules.</summary>
```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.if

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```
#
# May 2017, Victor Kamensky
#
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#
```

```
policy_module(polarispttcd, 1.0);
```

```
gen_require(^
    type polaris_pttcd_t;
)
```

```
polaris_btrace_data_manage(polaris_pttcd_t)
polaris_crft_data_manage(polaris_pttcd_t)
polaris_chasfs_manage(polaris_pttcd_t)
```

```

polaris_tdlresolve_read(polaris_pttcd_t)
polaris_tdlldb_list_dirs(polaris_pttcd_t)
polaris_lua_read(polaris_pttcd_t)
polaris_flashlib_read(polaris_pttcd_t)

auth_use_nsswitch(polaris_pttcd_t)
polaris_cpld_read(polaris_pttcd_t)

allow polaris_pttcd_t self:netlink_route_socket r_netlink_socket_perms;

polaris_disk_bootflash_search(polaris_pttcd_t)
polaris_bootflash_manage(polaris_pttcd_t)
polaris_persistent_getattr(polaris_pttcd_t)

type polaris_pttcd_tmp_t;
files_tmp_file(polaris_pttcd_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_pttcd_tmp_t, dir, "interceptor")
gen_require(^
    type polaris_btrace_tmppub_t;
)
manage_dirs_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)
manage_files_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)
manage_lnk_files_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)

allow polaris_pttcd_t self:tcp_socket create_stream_socket_perms;
allow polaris_pttcd_t self:udp_socket create_socket_perms;

corenet_tcp_bind_generic_node(polaris_pttcd_t)
corenet_tcp_bind_polaris_pttcd_port(polaris_pttcd_t)
corenet_tcp_connect_polaris_pttcd_port(polaris_pttcd_t)
corenet_udp_sendrecv_polaris_pttcd_port(polaris_pttcd_t)

sysnet_read_config(polaris_pttcd_t)

allow polaris_pttcd_t self:capability sys_resource;

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* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.te
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#
# August 2017, Shawn Lu
#
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#

policy_module(polarisrrmmgr, 1.0);

```

```

gen_require(
    type polaris_rrm_mgr_t;
)

polaris_btrace_data_manage(polaris_rrm_mgr_t)
polaris_chasfs_manage(polaris_rrm_mgr_t)
polaris_tdlresolve_read(polaris_rrm_mgr_t)
polaris_tdldb_list_dirs(polaris_rrm_mgr_t)
polaris_cpld_read(polaris_rrm_mgr_t)
polaris_lua_read(polaris_rrm_mgr_t)
polaris_flashlib_read(polaris_rrm_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_rrm_mgr_t)

polaris_db_tdldb_dir_use(polaris_rrm_mgr_t)

# allow to use setrlimit
allow polaris_rrm_mgr_t self:process setrlimit;
allow polaris_rrm_mgr_t self:capability sys_resource;
allow polaris_rrm_mgr_t self:capability dac_override;

# stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_rrm_mgr_t)
polaris_socketat_nsfs_read(polaris_rrm_mgr_t)

# allow to open udp socket on port 12134
corenet_udp_bind_polaris_rrm_mgr_port(polaris_rrm_mgr_t)
corenet_udp_bind_generic_node(polaris_rrm_mgr_t)
allow polaris_rrm_mgr_t self:udp_socket { create_socket_perms recv_msg send_msg };

corenet_udp_bind_polaris_rrm_clnt_port(polaris_rrm_mgr_t)

polaris_odm_clnt2svr_mqipc_create(polaris_rrm_mgr_t)

# access "/bootflash/.dbpersist"
polaris_tdldbpersist_setup(polaris_rrm_mgr_t)

# access /tmp/rp/tdldb/persistent-config/ dir and files in this dir
polaris_tmp_tdldb_persist_setup(polaris_rrm_mgr_t)

logging_send_syslog_msg(polaris_rrm_mgr_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.te
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#

```

```
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#
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#

policy_module(polariscyan, 1.0);

# dyncfg_setup.sh runs under cmand label

polaris_process_domain_template(dyncfg)

polaris_btrace_data_manage(polaris_dyncfg_t)
polaris_cpld_read(polaris_dyncfg_t)
polaris_lua_read(polaris_dyncfg_t)
polaris_cpld_dev_use(polaris_dyncfg_t)
polaris_rmonbifo_tmp_read(polaris_dyncfg_t)
polaris_chasfs_read(polaris_dyncfg_t)

# this script works with /tmp/dyncfg files
type polaris_dyncfg_tmp_t;
files_tmp_file(polaris_dyncfg_tmp_t)

files_tmp_filetrans(polaris_dyncfg_t, polaris_dyncfg_tmp_t, dir, "cyan")
files_tmp_filetrans(polaris_dyncfg_t, polaris_dyncfg_tmp_t, file)

manage_files_pattern(polaris_dyncfg_t, polaris_dyncfg_tmp_t, polaris_dyncfg_tmp_t)
manage_dirs_pattern(polaris_dyncfg_t, polaris_dyncfg_tmp_t, polaris_dyncfg_tmp_t)
manage_lnk_files_pattern(polaris_dyncfg_t, polaris_dyncfg_tmp_t, polaris_dyncfg_tmp_t)

corecmd_exec_bin(polaris_dyncfg_t)
corecmd_exec_shell(polaris_dyncfg_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_dyncfg_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_dyncfg_t)

# dyncfg_setup calls luajit and luajit needs execute JIT generated code
allow polaris_dyncfg_t self:process execmem;

# allow objstore access
polaris_disk_objstore_read(polaris_dyncfg_t)

type polaris_dyncfg_log_t;
files_tmp_file(polaris_dyncfg_log_t)
```

```

gen_require(
    attribute polaris_domain;
)

filetrans_pattern(polaris_domain, polaris_dynconfg_tmp_t, polaris_dynconfg_log_t, file, "cyan.log")
filetrans_pattern(polaris_domain, polaris_dynconfg_tmp_t, polaris_dynconfg_log_t, file, "cyan_runtime.log")
files_tmp_filetrans(polaris_domain, polaris_dynconfg_log_t, file, "cyan.lock")
manage_files_pattern(polaris_domain, polaris_dynconfg_tmp_t, polaris_dynconfg_log_t)

polaris_dynconfg_tmp_read(polaris_domain)

# on utah need to get model info
optional_policy(
    polaris_dash_dev_use(polaris_dynconfg_t)
)

#access to /dev/dash_fpga device on fugazi platform
ifdef(^fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_dynconfg_t)
)

# allow search and read under /tmp/boot directory
polaris_boot_tmp_read(polaris_dynconfg_t)

logging_send_syslog_msg(polaris_dynconfg_t)

# dynconfg needs access to idprom. Idprom is accessed differently depending on
# platform

# on utah idprom is in quack chip: hw_esg_read_midplane_idprom
# on platforms with idprom in quack chip need access to
# quack device as part of hw_esg_read_midplane_idprom call.
ifdef(^crankshaft_family',`
    polaris_quack_dev_use(polaris_dynconfg_t)
)
ifdef(^starfleet_platform',`
    polaris_quack_dev_use(polaris_dynconfg_t)
)

# on 1ng idprom is i2c device in sysfs like:
# /sys/devices/pci0000:00/0000:00:1f.3/i2c-0/i2c-1/1-0056/eeprom
# on ultra it is still emulated by i2c driver like:
# /sys/devices/i2c-0/i2c-1/1-0056/eeprom
dev_rw_sysfs(polaris_dynconfg_t)

# on nyquist and 1ng idprom value retrieved by flashlib and needs dac_override
allow polaris_dynconfg_t self:capability dac_override;
polaris_flashlib_read(polaris_dynconfg_t)

```

```

# LOOK AT ME on quake even rommon var read operation needs write access
# i.e flashutil -c getvar -N MODEL_NUM does open with O_RDWR
ifdef(^quake_platform',`
polaris_flashlib_write(polaris_dyncfg_t)
`)

# In chassis_attr.lua method THIS.WIRELESS checks whether wireless package is installed
# by opening (why open, not stat) wncmgrd binary.
optional_policy(`
    gen_require(`
        type polaris_wncmgrd_exec_t;
    `)
    read_files_pattern(polaris_dyncfg_t, bin_t, polaris_wncmgrd_exec_t)
`)

# lua/cyan/vwlc_chassis_attr.lua needs to read /bootflash/rommon_vars file on vwlc
ifdef(^wlc_family',`
polaris_bootflash_read(polaris_dyncfg_t)
`)

# lua/cyan/vwlc_chassis_attr.lua needs to read /boot/vcpu_template file on vwlc
ifdef(^wlc_family',`
polaris_disk_varied_read(polaris_dyncfg_t)
`)

# on macallan passport SUP card idprom is in act2 chip.
# hw_passport_read_midplane_idprom invoked from cyan_init
# reads /dev/act2 device.
ifdef(^ngwc_family',`
polaris_act2_dev_use(polaris_dyncfg_t)
`)

ifdef(^passport_platform',`
# open /dev/ttyS0 console in hw_passport_read_midplane_idprom, invoked by
# cyaninit
term_use_unallocated_ttys(polaris_dyncfg_t)
`)

# during wlc subpackage install cyan_init.sh called from
# C9800-Wireless_startup_script.sh script and output redirected
# into some install_tmp file
ifdef(^ngwc_family',`
polaris_install_tmp_log_write(polaris_dyncfg_t)
`)

# /dev/aikido access

```

```

polaris_aikido_dev_use(polaris_dyncfg_t)

gen_require(
    type rsync_t;
)

rsync_entry_domtrans(polaris_dyncfg_t, rsync_t)
corenet_tcp_connect_rsync_port(polaris_dyncfg_t)

#ifdef(^sumatra_platform)`
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
# /dev/mem
polaris_dev_mem_use(polaris_dyncfg_t)
)

# For Cabo, allow for stronger permissions to access env_var
#ifdef(^cabo_platform)`
polaris_proc_rmonbifo_read(polaris_dyncfg_t)
)

# For Cabo, also allow access to i2c-0
#ifdef(^cabo_platform)`
polaris_i2c_use(polaris_dyncfg_t)
)

# /dev/i2c-0 access
#ifdef(^petra_platform)`
polaris_i2c_use(polaris_dyncfg_t)
)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscyan.te
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#
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#
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#

policy_module(polarisflashcheck, 1.0);

gen_require(
    type polaris_flashcheck_t;
)

# allow read of /etc/passwd

```

```

auth_use_nsswitch(polaris_flashcheck_t)

corecmd_exec_bin(polaris_flashcheck_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_flashcheck_t)

# uses pidof
domain_read_all_domains_state(polaris_flashcheck_t)
dev_read_sysfs(polaris_flashcheck_t)

# df on "/" needs fs_t:filesystem getattr
fs_getattr_xattr_fs(polaris_flashcheck_t)

polaris_btrace_data_manage(polaris_flashcheck_t)
polaris_chasfs_manage(polaris_flashcheck_t)
polaris_cpld_read(polaris_flashcheck_t)

polaris_read_debug_conf(polaris_flashcheck_t)
polaris_boot_tmp_read(polaris_flashcheck_t)

logging_send_syslog_msg(polaris_flashcheck_t)

# directly output to /dev/ttyS0
term_use_unallocated_ttys(polaris_flashcheck_t)

polaris_bootflash_read(polaris_flashcheck_t)

allow polaris_flashcheck_t self:capability { sys_resource dac_override };

# pidof needs below
allow polaris_flashcheck_t self:capability sys_ptrace;

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_flashcheck_t)

# access of crashinfo dir for flash_check.sh, it does source of pglobals.sh
# which needs acces to /crashinfo
polaris_disk_crashinfo_getattr(polaris_flashcheck_t)

# this is for NFS access mounted in a dir of ncd context
optional_policy(`
    polaris_ncd_tmp_read(polaris_flashcheck_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.te

```

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```
#
# June 2017, Victor Kamensky
#
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#

## <summary>Polaris caf Policy Rules.</summary>

#####
## <summary>
##   Read /bootflash/iox/ files or harddisk IOX files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_files_read`,`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type polaris_iox_shared_files_t;
        type polaris_iox_alt_hdd_files_t;
    `
    `

    read_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    allow $1 polaris_iox_files_t:file map;

    `
)

#####
## <summary>
##   Manage /bootflash/iox/ files or harddisk IOX files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
```

```

#
interface(`polaris_iox_files_manage',`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type polaris_iox_shared_files_t;
        type polaris_iox_alt_hdd_files_t;
    `)

    manage_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    manage_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    manage_lnk_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    allow $1 polaris_iox_files_t:file map;

)

#####
## <summary>
##   List /bootflash/iox/ dir or harddisk IOX dir
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_dir_list',`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type httpd_var_run_t;
        type polaris_caf_var_run_t;
        type polaris_iox_shared_files_t;
        type polaris_iox_alt_hdd_files_t;
    `)

    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, httpd_var_run_t)
    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_caf_var_run_t)

```

```

)

#####
## <summary>
##   Search /bootflash/iox/ dir or harddisk IOX
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_dir_search`,`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_iox_shared_files_t;
    `)

    search_dirs_pattern($1, polaris_iox_files_t, polaris_iox_files_t)
)

#####
## <summary>
##   Read files like /guestshell/guestshell_set_netns.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_guestshell_files_read`,`
    gen_require(`
        type polaris_guestshell_t;
        type polaris_iox_shared_files_t;
    `)

    read_files_pattern($1, { polaris_guestshell_t polaris_iox_shared_files_t }, polaris_guestshell_t)
    read_lnk_files_pattern($1, { polaris_guestshell_t polaris_iox_shared_files_t }, polaris_guestshell_t)
)

#####
## <summary>
##   Execute files with polaris_guestshell_exec_t type
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.

```

```

## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_guestshell_exec_files_exec`,`
    gen_require(`
        type polaris_guestshell_exec_t;
    `)

    exec_files_pattern($1, polaris_guestshell_exec_t, polaris_guestshell_exec_t)
`)

#####
## <summary>
##   Manage /var/run/netns/guestshell files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_guestshell_var_run_files_manage`,`
    gen_require(`
        type polaris_guestshell_var_run_t;
        type var_run_t;
    `)

    manage_files_pattern($1, { polaris_guestshell_var_run_t var_run_t }, polaris_guestshell_var_run_t)
    manage_dirs_pattern($1, { polaris_guestshell_var_run_t var_run_t }, polaris_guestshell_var_run_t)
`)

#####
## <summary>
##   Read CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_read`,`
    gen_require(`
        type polaris_caf_tmp_files_t;
    `)

    read_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
`)

```

```

    read_lnk_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
    list_dirs_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
)

#####
## <summary>
##   Manage CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_manage`,`
gen_require(`
type polaris_caf_tmp_files_t;
`)
manage_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
manage_dirs_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
`)

#####
## <summary>
##   Getattr CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_getattr`,`
gen_require(`
type polaris_caf_tmp_files_t;
`)
getattr_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
`)

#####
## <summary>
##   Read CAF files. Typically at /opt/cisco/caf/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

#
interface(`polaris_caf_files_read`,`
    gen_require(`
        type polaris_caf_files_t;
    `)

    read_files_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
    read_lnk_files_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
    list_dirs_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
)

#####
## <summary>
##   Manage ../guestshell/rootfs_mnt/cisco/cisco_cli/
## This files are used to communicate between guestshell container
## iosd, and shell_exec.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_caf_var_run_files_manage`,`
    optional_policy(`
        gen_require(`
            type polaris_caf_var_run_t;
        `)

        manage_files_pattern($1, polaris_caf_var_run_t, polaris_caf_var_run_t)
        manage_dirs_pattern($1, polaris_caf_var_run_t, polaris_caf_var_run_t)
    `)
)

#####
## <summary>
##   Read /etc/guestshell_rsa_key file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_guestshell_key_read`,`
    gen_require(`

```

```

        type etc_t;
        type polaris_guestshell_ssh_key_t;
    )

    read_files_pattern($1, etc_t, polaris_guestshell_ssh_key_t)
)

#####
## <summary>
##   Manage .../local/local1/core_dir/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_caf_local_core_files_manage`,`
optional_policy(`
gen_require(`
    type polaris_caf_core_files_t;
)
)

manage_files_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
manage_dirs_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
manage_lnk_files_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
)
)

#####
## <summary>
##   Manage /mnt/sd3/iox_alt_hdd.dsk and
##   /mnt/sd3/iox_alt_hdd_mount_dir
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_iox_alt_hdd_manage`,`
optional_policy(`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type polaris_iox_alt_hdd_files_t;

```

```

    )

    manage_files_pattern($1, polaris_iox_alt_hdd_files_t, polaris_iox_alt_hdd_files_t)
    manage_dirs_pattern($1, polaris_iox_alt_hdd_files_t, polaris_iox_alt_hdd_files_t)
  )
)

```

```
#####
```

```

## <summary>
##   Getattr alternate harddisk files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_alt_hdd_getattr`,`
  gen_require(`
    type polaris_iox_alt_hdd_files_t;
  `)

  allow $1 polaris_iox_alt_hdd_files_t:filesystem getattr;
)

```

```
#####
```

```

## <summary>
##   Manage tty device link files. Typically at /dev/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tty_lnk_manage`,`
  gen_require(`
    type polaris_caf_tty_file_t;
  `)

  create_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
  read_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
  delete_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
)

```

```
#####
```

```

## <summary>
##   Manage tty device chr files.

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_chr_file_read`,`
    gen_require(`
        type devpts_t;
    `)

    setattr_chr_files_pattern($1, devpts_t, devpts_t)
    read_chr_files_pattern($1, devpts_t, devpts_t)
`)

#####
## <summary>
## Execute caf in the polaris_caf domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_caf_domtrans`,`
    gen_require(`
        type polaris_caf_t, polaris_caf_exec_t;
    `)

    domtrans_pattern($1, polaris_caf_exec_t, polaris_caf_t)
`)

#####
## <summary>
## Provide process signal perms.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_proc_signal_perms`,`
    gen_require(`
        type polaris_caf_t;
    `)

```

```
allow $1 polaris_caf_t:process sigkill;
')
```

```
#####
```

```
## <summary>
```

```
## Write/read /tmp/ioxss_up file
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ioxss_rp_tmp_manage`,`
```

```
gen_require(`
```

```
type polaris_ioxss_rp_tmp_t;
```

```
`)
```

```
manage_files_pattern($1,{polaris_ioxss_rp_tmp_t }, polaris_ioxss_rp_tmp_t)
```

```
')
```

```
#####
```

```
## <summary>
```

```
## Getattr of iosd_portal_app_lipc socket file
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <rolebase/>
```

```
#
```

```
interface(`polaris_iosd_portal_app_lipc_getattr`,`
```

```
gen_require(`
```

```
type polaris_iosd_portal_app_lipc_t;
```

```
`)
```

```
getattr_sock_files_pattern($1, polaris_iosd_portal_app_lipc_t, polaris_iosd_portal_app_lipc_t)
```

```
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscaf.if

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

# All rights reserved

#

/usr/cpp/bin/cpp\_cp\_svr -- gen\_context(system\_u:object\_r:polaris\_cpp\_cp\_exec\_t,s0)

/usr/cpp/bin/cpp\_cp\_svr\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_cp\_exec\_t,s0)

/usr/cpp/bin/cpp\_cp\_svr\_us\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_cp\_exec\_t,s0)

/usr/cpp/bin/cpp\_cp\_svr\_vwlc -- gen\_context(system\_u:object\_r:polaris\_cpp\_cp\_exec\_t,s0)

/usr/cpp/bin/cpp\_cp\_svr\_vwlc\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_cp\_exec\_t,s0)

/usr/binos/conf/geo\_ipv4\_db -- gen\_context(system\_u:object\_r:polaris\_geodb\_files\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcp.fc

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#

# March 2017, Victor Kamensky

#

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#

# polarisnifmgr file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.fc

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#

# November 2017, Victor Kamensky

#

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#

policy\_module(polarisgnmib, 1.0);

gen\_require(^

    type polaris\_gnmib\_t;

')

polaris\_btrace\_data\_manage(polaris\_gnmib\_t)

polaris\_crft\_data\_manage(polaris\_gnmib\_t)

polaris\_chasfs\_manage(polaris\_gnmib\_t)

polaris\_tdlresolve\_read(polaris\_gnmib\_t)

polaris\_tdlldb\_list\_dirs(polaris\_gnmib\_t)

polaris\_cpld\_read(polaris\_gnmib\_t)

polaris\_lua\_read(polaris\_gnmib\_t)

polaris\_flashlib\_read(polaris\_gnmib\_t)

```

polaris_db_tdlldb_dir_use(polaris_gnmib_t)

optional_policy(
# deals with /dev/shm/confd setup (schema and pid)
polaris_confd_shm_setup(polaris_gnmib_t)
# and allow read shared schema
polaris_confd_shared_schema_read(polaris_gnmib_t)
# from evconfd_dynamic_load
polaris_confd_shared_schema_watch(polaris_gnmib_t)
# read /proc/confd_pid/exe file
polaris_confd_read(polaris_gnmib_t)
')

allow polaris_gnmib_t self:capability dac_override;

logging_send_syslog_msg(polaris_gnmib_t)

# create ndbutil directory under /var/lock
polaris_confd_ndbutil_create(polaris_gnmib_t)

polaris_ndbutil_lock_template(polaris_gnmib_t, gnmib, ".l.schema_use.gnmib")

# grpc library through sysconf accesses /sys/devices/system/cpu
# to get number of CPUs
dev_read_sysfs(polaris_gnmib_t)

# gnmib uses multiple (configurable) tcp ports for secure and insecure mode
corenet_tcp_bind_generic_port(polaris_gnmib_t)
allow polaris_gnmib_t self:tcp_socket { shutdown };
corenet_tcp_connect_all_ports(polaris_gnmib_t)

# iospl_token_read_from_file reads /tmp/rp/.iospl_gnmib
polaris_gnmib_token_read(polaris_gnmib_t)

# gnmib creates /var/tmp/gnmib.pid
type polaris_gnmib_var_t;
files_tmp_file(polaris_gnmib_var_t);
files_tmp_filetrans(polaris_gnmib_t, polaris_gnmib_var_t, file, "gnmib.pid");
manage_files_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)
manage_dirs_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)
manage_lnk_files_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)

# read access to /dev/random
dev_read_rand(polaris_gnmib_t)

kernel_read_net_sysctls(polaris_gnmib_t)

```

```

type polaris_gnmib_gnoi_images_t;
files_type(polaris_gnmib_gnoi_images_t);
polaris_bootflash_filetrans(polaris_gnmib_t, polaris_gnmib_gnoi_images_t, file,);
manage_files_pattern(polaris_gnmib_t, polaris_disk_bootflash_t, polaris_gnmib_gnoi_images_t)

# need to execute install engine scripts
polaris_install_engine_domtrans(polaris_gnmib_t)

# need access to shell to execute install scripts
corecmd_exec_shell(polaris_gnmib_t)
corecmd_exec_bin(polaris_gnmib_t)

# install script needs rmonbifo
polaris_rmonbifo_tmp_read(polaris_gnmib_t)

# not sure why this is needed
auth_map_passwd(polaris_gnmib_t)

#DB persistence
polaris_tldbpersist_setup(polaris_gnmib_t)
polaris_tmp_tldb_persist_setup(polaris_gnmib_t)

allow polaris_gnmib_t self:capability sys_resource;

# needed to fstat and check space when transferring image for os.proto install rpc
fs_getattr_xattr_fs(polaris_gnmib_t)

# needed by gnmib ui because uipeer heartbeat timer accesses TDL epoch files
polaris_issu_tmp_files_read(polaris_gnmib_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgnmib.te
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#
# October 2019, Patrick O'Halloran
#
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#

/usr/binos/conf/mcp_crft_request.sh -- gen_context(system_u:object_r:polaris_crft_request_exec_t,s0)

#NGWC - nyquist, edison, bigbang
/mnt/sd3/user/.CRFT(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
/mnt/sd3/user/.CRFT/[0-9]*(/.*?)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
/mnt/sd3/user/.CRFT/archive(/.*?)? gen_context(system_u:object_r:polaris_crft_data_t,s0)

```

#NGWC - macallan, starfleet

```
/flash1/user/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/user/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/user/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

#MCP, QWLC

```
/vol/harddisk/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/vol/harddisk/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/vol/harddisk/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

#VXE, WLC, CRANKSHAFT, MCP

```
/bootflash/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/bootflash/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/bootflash/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

#CRANKSHAFT - blackheart, sparrow

```
/flash1/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

#PETRA - petra

# USER is a reserved selinux keyword - escape it like this

```
/flash10/USE[R]/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash10/USE[R]/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash10/USE[R]/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrft.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

# polariscmm file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmm.fc

No license file was found, but licenses were detected in source scan.

#

# July 2017, Victor Kamensky

#

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```

#

## <summary>Polaris install Policy Rules.</summary>

#####
## <summary>
## Read polaris_sw_data_t, effectively path to read polaris
## base image packages
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sw_data_read`,`
gen_require(`
type polaris_sw_data_t;
type tmp_t;
`)
read_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
read_lnk_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
list_dirs_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
`)

#####
## <summary>
## Map polaris_sw_data_t, effectively path to map polaris
## base image packages
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sw_data_map`,`
gen_require(`
type polaris_sw_data_t;
`)
allow $1 polaris_sw_data_t:file map;
`)

#####
## <summary>
## Manage polaris_sw_data_t, effectively path to set up polaris
## base image packages house holding

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sw_data_manage`,`
gen_require(`
type polaris_sw_data_t;
type tmp_t;
`)
manage_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
manage_lnk_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
manage_dirs_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
allow $1 polaris_sw_data_t.dir mounton;
`)

#####
## <summary>
## Read polaris_patch_data_t, effectively path to read polaris
## smu patch or optional packages
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_patch_data_read`,`
gen_require(`
type polaris_patch_data_t;
type tmp_t;
`)
read_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
read_lnk_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
list_dirs_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
`)

#####
## <summary>
## Manage polaris_patch_data_t, effectively path to set up polaris
## smu patch or optional packages house holding
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>

```

```

## </param>
#
interface(`polaris_patch_data_manage',`
gen_require(`
type polaris_patch_data_t;
type tmp_t;
`)
manage_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
manage_lnk_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
manage_dirs_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
`)

#####
## <summary>
## Watch patch_data directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_patch_data_watch',`
gen_require(`
type polaris_patch_data_t;
`)
allow $1 polaris_patch_data_t:dir watch;
`)

#####
## <summary>
## Write into tmp files created by install_show.sh
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_show_tmp_write',`
gen_require(`
type polaris_install_show_tmp_t;
type tmp_t;
`)
write_files_pattern($1, { tmp_t polaris_install_show_tmp_t }, polaris_install_show_tmp_t)
`)

```

```
#####
## <summary>
## Read tmp files created by install_show.sh
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_show_tmp_read`,`
gen_require(`
type polaris_install_show_tmp_t;
type tmp_t;
`)
read_files_pattern($1, { tmp_t polaris_install_show_tmp_t }, polaris_install_show_tmp_t)
')
```

```
#####
## <summary>
## Manage tmp installer files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_install_show_tmp_manage`,`
gen_require(`
type polaris_install_show_tmp_t;
`)
manage_dirs_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
manage_files_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
manage_lnk_files_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
')
```

```
#####
## <summary>
## Manage /bootflash/.issu_loc_lock files
## TODO: provfunc.sh and hman have reference to /bootflash/$ISSU_LOCAL_LOCK_FILE.
## For now, I am keeping manage_dirs_pattern for polaris_disk_bootflash_t.
## Need to re-visit so that callers to this macro do not have write-permission
## to all of bootflash..
## </summary>
## <param name="domain">
## <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_issu_files_manage',`
    gen_require(`
        type polaris_issu_files_t;
        type polaris_disk_bootflash_t;
    `)

    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_issu_files_t, file, ".issu_loc_lock")
    manage_files_pattern($1, polaris_issu_files_t, polaris_issu_files_t)
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_issu_files_t)
)

#####
## <summary>
## Manage ISSU tmp files, allowing to record and
## check upgrade progress
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_issu_tmp_files_manage',`
    gen_require(`
        type polaris_issu_tmp_files_t;
        type tmp_t;
    `)

    manage_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
    manage_lnk_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
    manage_dirs_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
)

#####
## <summary>
## Write/read any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_install_manage',`

```

```

gen_require(
    type polaris_disk_install_t;
)
manage_dirs_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
manage_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
manage_lnk_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
allow $1 polaris_disk_install_t:dir watch;
)

```

```
#####
```

```

## <summary>
##   Read any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface( polaris_disk_install_read, `
    gen_require(
        type polaris_disk_install_t;
    )
    search_dirs_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
    read_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
    read_lnk_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
    allow $1 polaris_disk_install_t:dir {watch read};
)

```

```
#####
```

```

## <summary>
##   Get attributes of any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface( polaris_disk_install_fs_getattr, `
    gen_require(
        type polaris_disk_install_t;
    )
    allow $1 polaris_disk_install_t:filesystem getattr;
)

```

```
#####
```

```
## <summary>
```

```

## Manage /tmp/installer files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_install_tmp_manage`,`
gen_require(`
type polaris_install_tmp_t;
`)
manage_dirs_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
manage_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
manage_lnk_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
manage_fifo_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
`)

```

```
#####
```

```

## <summary>
## Read /tmp/installer files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_install_tmp_read`,`
gen_require(`
type polaris_install_tmp_t;
`)
list_dirs_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
read_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
read_lnk_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
allow $1 polaris_install_tmp_t:dir watch;
allow $1 polaris_install_tmp_t:file map;
`)

```

```
#####
```

```

## <summary>
## Execute install related scripts in its own domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>

```

```

#
interface(`polaris_install_engine_domtrans`,`
    gen_require(`
        type polaris_install_engine_t, polaris_install_engine_exec_t;
    `)

    domtrans_pattern($1, polaris_install_engine_exec_t, polaris_install_engine_t)
)

#####
## <summary>
##   Write into tmp log files created by install engine
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_tmp_log_write`,`
    gen_require(`
        type polaris_install_tmp_log_t;
    `)
    write_files_pattern($1, polaris_install_tmp_log_t, polaris_install_tmp_log_t)
)

#####
## <summary>
##   Execute install selinux related scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_selinux_domtrans`,`
    gen_require(`
        type polaris_install_selinux_t, polaris_install_selinux_exec_t;
    `)

    domtrans_pattern($1, polaris_install_selinux_exec_t, polaris_install_selinux_t)
)

#####
## <summary>
##   Execute wireless install related scripts in its own domain.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_wireless_domtrans`,`
    gen_require(`
        type polaris_install_wireless_t, polaris_install_wireless_exec_t;
    `)

    domtrans_pattern($1, polaris_install_wireless_exec_t, polaris_install_wireless_t)
`)

#####
## <summary>
## Execute install show scripts in its own domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_show_domtrans`,`
    gen_require(`
        type polaris_install_show_t, polaris_install_show_exec_t;
    `)

    domtrans_pattern($1, polaris_install_show_exec_t, polaris_install_show_t)
`)

#####
## <summary>
## Allow the specified domain to manage KGV data files
## I.e under /tmp/pkg_cs_debug created by function verify_pkg
## common scripts file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pkg_cs_debug_manage`,`
    gen_require(`
        type polaris_pkg_cs_debug_t;
    `)

```

```
files_tmp_filetrans($1, polaris_pkg_cs_debug_t, dir, "pkg_cs_debug")
fs_tmpfs_filetrans($1, polaris_pkg_cs_debug_t, dir, "pkg_cs_debug")
manage_dirs_pattern($1, polaris_pkg_cs_debug_t, polaris_pkg_cs_debug_t)
manage_files_pattern($1, polaris_pkg_cs_debug_t, polaris_pkg_cs_debug_t)
')
```

```
#####
```

```
## <summary>
##   Manage /file which is generated on "flock -u file /tmp/sysctrl_i2c.lock"
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_i2c_lock_file_manage`,`
  gen_require(`
    type polaris_i2c_lock_file_t;
  `)
  manage_dirs_pattern($1, polaris_i2c_lock_file_t, polaris_i2c_lock_file_t)
  manage_files_pattern($1, polaris_i2c_lock_file_t, polaris_i2c_lock_file_t)
')
```

```
#####
```

```
## <summary>
##   write /tmp/installer files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
```

```
interface(`polaris_install_tmp_write`,`
  gen_require(`
    type polaris_install_tmp_t;
  `)
  write_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  allow $1 polaris_install_tmp_t:dir watch;
')
```

```
#####
```

```
## <summary>
##   Read/Write /.images files and directories
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_install_images_manage`,`
    gen_require(`
        type polaris_install_images_t;
    `)

    manage_dirs_pattern($1, polaris_install_images_t, polaris_install_images_t)
    manage_files_pattern($1, polaris_install_images_t, polaris_install_images_t)
)

#####
## <summary>
## Read ISSU tmp files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_issu_tmp_files_read`,`
    gen_require(`
        type polaris_issu_tmp_files_t;
        type tmp_t;
    `)

    list_dirs_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
    read_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
    read_lnk_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
    allow $1 polaris_issu_tmp_files_t:file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisinstall.if

No license file was found, but licenses were detected in source scan.

```

#
# August 2017, Shawn Lu
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#

```

policy\_module(polarisodm, 1.0);

gen\_require(`

```

    type polaris_odm_t;
)

polaris_btrace_data_manage(polaris_odm_t)
polaris_crft_data_manage(polaris_odm_t)
polaris_chasfs_manage(polaris_odm_t)
polaris_tdlresolve_read(polaris_odm_t)
polaris_tdlldb_list_dirs(polaris_odm_t)
polaris_cpld_read(polaris_odm_t)
polaris_lua_read(polaris_odm_t)
polaris_flashlib_read(polaris_odm_t)

polaris_ripc_sman_ui_serv_connect(polaris_odm_t)

polaris_db_tdlldb_dir_use(polaris_odm_t)

# allow setrlimit
allow polaris_odm_t self:capability sys_resource;
allow polaris_odm_t self:process setrlimit;
allow polaris_odm_t self:capability dac_override;

# odm_svr2clnt_data uses subdirectory for channels needs explicit rule
# to allow it. ODM elastic value is 2 now, add more if need in the
# future.
gen_require(^
    type polaris_odm_server2client_data_mqipc_t;
)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data-b1)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data-b0)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data)

logging_send_syslog_msg(polaris_odm_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodm.te

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#

```

## <summary>Polaris polarisreflector Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisreflector.if

No license file was found, but licenses were detected in source scan.

```
#
# June 2017, Victor Kamensky
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#

policy_module(polariscontainer, 1.0);

# polaris_default_container_t type for not labeled container
polaris_container_domain_template(default)

# polaris_utd_container_t type for snort container
polaris_container_domain_template(utd)
polaris_utd_container(polaris_utd_container_t)

# polaris_utdl_container_t type for snort container, that has
# legacy configuration, need more permissions
polaris_container_domain_template(utdl)
polaris_utd_container(polaris_utdl_container_t)

# manage /tmp/xml/{Utd*} dirs
polaris_vman_log_files_manage(polaris_utdl_container_t)
optional_policy(
    polaris_cedge_xml_tmp_manage(polaris_utdl_container_t)
)

allow polaris_utdl_container_t ramfs_t:file map;

polaris_iox_container_watch(polaris_utdl_container_t)

# work with memif
optional_policy(
    polaris_qfp_dgram_send(polaris_utdl_container_t)
)

# creates /tmp/HTX-IOX/sw-htx-service
optional_policy(
    polaris_htx_iox_tmp_manage(polaris_utdl_container_t)
)
optional_policy(
    polaris_htx_use_client_socket(polaris_utdl_container_t)
)

# allow container to work with /tmp/binos-IOX
optional_policy(
```

```

    polaris_qfp_memif_manage(polaris_utdl_container_t)
)

# snort works with /dev/shm/SPO_DAO_MMAP_OBJ_
fs_exec_tmpfs_files(polaris_utdl_container_t)

# allow container to work with /tmp/xml/* files
optional_policy(
    polaris_vman_tmp_manage(polaris_utdl_container_t)
)

gen_require(
    type container_file_t;
)
polaris_disk_type(container_file_t)

# legacy utd (snort) container in /etc/init.d/rc.local does unconditional
# mount of ramfs on /tmp/snortlogs
fs_mount_ramfs(polaris_utdl_container_t)
# legacy utd (snort) container in /etc/init.d/rc.local does unconditional
# mount of tmpfs on /dev/shm
fs_mount_tmpfs(polaris_utdl_container_t)
fs_manage_tmpfs_dirs(polaris_utdl_container_t)
fs_manage_tmpfs_files(polaris_utdl_container_t)
fs_manage_tmpfs_symlinks(polaris_utdl_container_t)

# Allow ramfs access to utd container
fs_manage_ramfs_dirs(polaris_utdl_container_t)
fs_manage_ramfs_files(polaris_utdl_container_t)

# Allow link file access from cron to crond
kernel_read_state(polaris_utdl_container_t)

# Allow Snort
allow polaris_utdl_container_t self:packet_socket map;

# polaris_iox_container_t type for generic IOx containers
polaris_container_domain_template(iox)

fs_mount_tmpfs(polaris_iox_container_t)
fs_manage_tmpfs_dirs(polaris_iox_container_t)
fs_manage_tmpfs_files(polaris_iox_container_t)
fs_manage_tmpfs_symlinks(polaris_iox_container_t)
fs_manage_tmpfs_sockets(polaris_iox_container_t)
# fs_manage_tmpfs_fifo_files is missing
gen_require(
    type tmpfs_t;
)

```

```

manage_fifo_files_pattern(polaris_iox_container_t, tmpfs_t, tmpfs_t)
fs_mounon_tmpfs(polaris_iox_container_t)
# container systemd file mmapfs tmpfs_t, i.e /usr/lib/systemd/systemd-journald
allow polaris_iox_container_t tmpfs_t:file map;

# container reads ip netns identity <pid>
fs_read_nsfs_files(polaris_iox_container_t)

# container systemd does remount of some file systems
gen_require(
    type svirt_sandbox_file_t;
)
allow polaris_iox_container_t svirt_sandbox_file_t:filesystem { remount };

polaris_caf_var_run_files_manage(polaris_iox_container_t)
# permit access to /local core files between host and container
polaris_caf_local_core_files_manage(polaris_iox_container_t)

allow polaris_iox_container_t self:cap_usersn { chown dac_override dac_read_search fsetid setgid setpcap setuid
sys_admin sys_boot };

gen_require(
    type devpts_t;
    type polaris_iox_container_t;
    type container_runtime_t;
    class fifo_file { getattr ioctl read write };
    class chr_file { getattr ioctl open read setattr write };
)

#===== polaris_iox_container_t =====
allow polaris_iox_container_t container_runtime_t:fifo_file { getattr setattr ioctl open read write };
allow polaris_iox_container_t devpts_t:chr_file { getattr ioctl open read setattr write };

# Normally lipc denials are addressed by code that is generated from TDL.
# I.e if process need to access lipc service it just need to be listed as 'client' of proper TDL service.
# If in this case iox_container process does not have its own TDL proc_def entry,
# therefore we use autogenerated polaris_lipc_iosd_portal_app_write macro/interface.
# Marking this policy optional, so that if platform TDL does not have proper service defined
# then polaris_lipc_iosd_portal_app_write won't be generated, but container policy still would compile.
optional_policy(
    gen_require(
        type polaris_iosd_t;
    )
    polaris_lipc_iosd_portal_app_write(polaris_iox_container_t, polaris_iosd_t)
)

docker_exec_lib(polaris_iox_container_t)
fs_exec_hugetlbfs_files(polaris_iox_container_t)

```

```

kernel_read_ring_buffer(polaris_iox_container_t)
dev_read_sysfs(polaris_iox_container_t)
polaris_iox_container_watch(polaris_iox_container_t)

# polaris_sdavc_container_t type for SDAVC container, that has
# legacy configuration, need more permissions

polaris_container_domain_template(sdavc)
polaris_utd_container(polaris_sdavc_container_t)

# manage /tmp/xml/{SDAVC*} dirs
polaris_vman_log_files_manage(polaris_sdavc_container_t)

# legacy SDAVC container in /etc/init.d/rc.local does unconditional
# mount of tmpfs on /dev/shm
fs_mount_tmpfs(polaris_sdavc_container_t)

# container systemd mounton tmpfs_t & tmpfs management
fs_mounton_tmpfs(polaris_sdavc_container_t)
fs_manage_tmpfs_dirs(polaris_sdavc_container_t)
fs_manage_tmpfs_files(polaris_sdavc_container_t)
fs_manage_tmpfs_symlinks(polaris_sdavc_container_t)
fs_manage_tmpfs_sockets(polaris_sdavc_container_t)
manage_fifo_files_pattern(polaris_sdavc_container_t, tmpfs_t, tmpfs_t)
# container systemd file mmapped tmpfs_t, i.e /usr/lib/systemd/systemd-journald
allow polaris_sdavc_container_t tmpfs_t:file map;
# Add watch on tmpfs_t/container_t dir/files
polaris_iox_container_watch(polaris_sdavc_container_t)

# map/mount/write hugetlbfs files
gen_require(
    type hugetlbfs_t;
)
allow polaris_sdavc_container_t hugetlbfs_t:filesystem mount;
allow polaris_sdavc_container_t hugetlbfs_t:file map;
fs_manage_hugetlbfs_dirs(polaris_sdavc_container_t)

# Allow syslog_mod operation on kernel_t
kernel_clear_ring_buffer(polaris_sdavc_container_t)

# Allow tcpdump
allow polaris_sdavc_container_t self:packet_socket map;
allow polaris_utd_container_t self:packet_socket map;

# add in the docker files labels to polaris_disk_type
gen_require(
    type container_var_lib_t;

```

```

    type container_share_t;
    type container_log_t;
)
polaris_disk_type(container_var_lib_t)
polaris_disk_type(container_share_t)
polaris_disk_type(container_log_t)

# polaris_waas_container_t type for WAAS KVM
polaris_kvm_domain_template(waas)

#Allow rw block files access to /dev/lvm_raid
storage_dontaudit_write_fixed_disk(polaris_waas_container_t)
storage_dontaudit_read_fixed_disk(polaris_waas_container_t)
#Manage hugetlbfs files/dirs
fs_manage_hugetlbfs_dirs(polaris_waas_container_t)
manage_files_pattern(polaris_waas_container_t, hugetlbfs_t, hugetlbfs_t)
fs_exec_hugetlbfs_files(polaris_waas_container_t)

#allow access of /dev/kvm device
dev_rw_kvm(polaris_waas_container_t)

#allow domain to search/write to virlogd_t
polaris_vman_virtlog_allow(polaris_waas_container_t)

# Allow for guest-share
gen_require(
    type polaris_iox_shared_files_t;
)
manage_files_pattern(polaris_iox_container_t, polaris_iox_shared_files_t, polaris_iox_shared_files_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscontainer.te

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarispvp Policy Rules.</summary>

#####
## <summary>
##   Execute a domain transition to run pvp.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_pvp_domtrans`,`
    gen_require(`
        type polaris_pvp_t, polaris_pvp_exec_t;
    `)

    domtrans_pattern($1, polaris_pvp_exec_t, polaris_pvp_t)
`)

#####
## <summary>
## Manage pvp temporary files and directories in /tmp.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pvp_manage_tmp_files`,`
    gen_require(`
        type polaris_pvp_tmp_t;
    `)

    manage_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
    manage_dirs_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
    manage_fifo_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
`)

#####
## <summary>
## Manage pvp process_state files and directories in
## /tmp/[rp|fp|cc]/pvp/process_state.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pvp_manage_process_state_files`,`
    gen_require(`
        type polaris_process_state_t;
    `)

```

```

    ')

    manage_files_pattern($1, polaris_process_state_t, polaris_process_state_t)
')

#####
## <summary>
##   Getattr dirs pvp temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_getattrs_tmp_dirs`,`
    gen_require(`
        type tmp_t;
        type polaris_pvp_tmp_t;
    `)

    getattr_dirs_pattern($1, tmp_t, polaris_pvp_tmp_t)
')

#####
## <summary>
##   Read from pvp stdin. Should be granted to scripts spawned
##   from pvp with domain transition. pvp stdin (0) points to fifo
##   file like /tmp/rp/pvp/work/inot_fifo
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_stdin_read`,`
    gen_require(`
        type polaris_pvp_tmp_t;
    `)

    read_fifo_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
')

#####
## <summary>
##   Read pvp temporary files and directories in /tmp.
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_read_tmp_files`,`
    gen_require(`
        type tmp_t;
        type polaris_pvp_tmp_t;
    `)

    rw_files_pattern($1, { tmp_t polaris_pvp_tmp_t }, polaris_pvp_tmp_t)
)

```

```
#####
```

```

## <summary>
##   Read pvp SAI files under
## /tmp/[rp|fp|cc/*]/pvp/sai_process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_read_sai_files`,`
    gen_require(`
        type polaris_pvp_sai_t;
    `)

    read_files_pattern($1, polaris_pvp_sai_t, polaris_pvp_sai_t)
    list_dirs_pattern($1, polaris_pvp_sai_t, polaris_pvp_sai_t)
    allow $1 polaris_pvp_sai_t:dir watch;
)

```

```
#####
```

```

## <summary>
##   Delete pvp SAI dirs and files under
## /tmp/[rp|fp|cc/*]/pvp/sai_process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_delete_sai_files`,`
    gen_require(`

```

```

    type polaris_pvp_sai_t;
  )
  allow $1 polaris_pvp_sai_t:dir { remove_name rmdir write };
  allow $1 polaris_pvp_sai_t:file unlink;
)

```

```
#####
```

```

## <summary>
##   Watch pvp process_state directories
## </summary>

```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```
## </param>
```

```
## <rolebase/>
```

```
#
```

```
interface(`polaris_process_state_watch`,`
```

```
gen_require(`
```

```
type polaris_process_state_t;
```

```
)
```

```
allow $1 polaris_process_state_t:dir watch;
```

```
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispvp.if

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisrmonbifo, 1.0);
```

```
#####
```

```
# Polaris Rmonbifo Driver policy
```

```
#####
```

```
# note polaris_proc_rmonbifo_t is defined in kernel/kernel.te, since genfscon
```

```
# statements could be only in base policy
```

```
type polaris_rmonbifo_tmp_t;
```

```
files_type(polaris_rmonbifo_tmp_t)
```

```
polaris_systemd_tmpfiles_tmp_filetrans(polaris_rmonbifo_tmp_t, dir, "rmonbifo")
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.te

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#

# February 2020, Victor Kamensky

#

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#

/bootflash/sdavic(/.\*)? gen\_context(system\_u:object\_r:polaris\_sdavic\_proxy\_files\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissdavicproxy.fc

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#

# August 2017, Shawn Lu

#

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#

# polarisodm file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodm.fc

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#

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#

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#

/usr/binos/conf/auto\_upgrade\_client.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_trigger.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_client\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/tmp/etc/installer gen\_context(system\_u:object\_r:polaris\_autoupgrade\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.fc

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```
#  
# October 2017, Victor Kamensky  
#  
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#
```

```
# polariswstatsd file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswstatsd.fc
```

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```
#  
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#  
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#
```

```
/usr/binos/conf/bexecute.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/bin/bexecute -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
# still exists for backward compatibility  
/tmp/etc/bexecute -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/bexec.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/brelay.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/bin/brelay -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/ioucon.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/runin.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/runin_exec_proc.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/runon.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
/usr/binos/conf/in.telnetd.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)  
  
/usr/binos/conf/brelay_console.sh -- gen_context(system_u:object_r:polaris_bconsole_exec_t,s0)  
  
# mcp_chvrf.sh used by some systemd units to switch vrf (ip namespace)  
# of xinetd that drives brelay service  
/usr/binos/conf/mcp_chvrf.sh -- gen_context(system_u:object_r:polaris_chvrf_exec_t,s0)  
  
# used by "request platform software system shell" CLI  
/usr/binos/conf/mcp_record_shell.sh -- gen_context(system_u:object_r:polaris_platform_shell_exec_t,s0)  
/usr/binos/conf/mcp_shell.sh -- gen_context(system_u:object_r:polaris_shell_exec_t,s0)  
  
# used by "sh pla so process memory r0 name iosd maps" CLI  
/usr/binos/conf/mcp_process_maps.sh -- gen_context(system_u:object_r:polaris_process_maps_exec_t,s0)
```

```

# used by "req platform software console attach switch standby R0" CLI
/usr/binos/conf/mcp_console_attach.sh -- gen_context(system_u:object_r:polaris_mcp_console_attach_exec_t,s0)
/usr/binos/bin/ioucon -- gen_context(system_u:object_r:polaris_ioucon_exec_t,s0)

# ngio_module_session.sh used by "hw-module session" CLI
/usr/binos/conf/ngio_module_session.sh -- gen_context(system_u:object_r:polaris_ngio_module_session_exec_t,s0)

#used by "upgrade rom-monitor capsule primary switch 1 R0" CLI
/usr/binos/conf/cat9k-primary-capsule-upgrade.sh --
gen_context(system_u:object_r:polaris_capsule_upgrade_exec_t,s0)

/usr/binos/conf/cat9k-capsule-upgrade.sh -- gen_context(system_u:object_r:polaris_capsule_upgrade_exec_t,s0)

/mnt/sd3/user/capsule-upgrade.log -- gen_context(system_u:object_r:polaris_capsule_upgrade_log_t,s0)
/usr/binos/conf/mcp_dmesg_service.sh -- gen_context(system_u:object_r:polaris_mcp_dmesg_exec_t,s0)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbexecute.fc
```

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```

#
# August 2017, Shawn Lu
#
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#

## <summary>Polaris wncd Policy Rules.</summary>

```

```
#####
```

```

## <summary>
##   Read files under /mnt/images/...these are related to AccessPoint images
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_wlc_ap_images_read`,`
  gen_require(`
    type polaris_wlc_ap_images_t;
  `)

```

```

  read_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
  read_lnk_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
  list_dirs_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
  allow $1 polaris_wlc_ap_images_t:file map;

```

```

)

## <summary>
##   Manage files under /mnt/images/...these are related to AccessPoint images
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_wlc_ap_images_manage`,`
  gen_require(`
    type polaris_wlc_ap_images_t;
    type mnt_t;
  `)

  manage_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
  manage_lnk_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
  manage_dirs_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)

  # transition when /mnt/images is created
  filetrans_pattern($1, mnt_t, polaris_wlc_ap_images_t, dir, "images")
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncd.if
No license file was found, but licenses were detected in source scan.

```

```

#
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#
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#

## <summary>Polaris esg_tam_cfg Policy Rules.</summary>

#####
## <summary>
##   Getattr dirs pvp temporary directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_tam_getattrs_tmp_dirs`,`
    gen_require(`
        type tmp_t;
        type polaris_tam_tmp_t;
    `)

    getattr_dirs_pattern($1, tmp_t, polaris_tam_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisesgtamcfg.if

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```

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#

```

```

## <summary>Polaris MQIPC Policy Rules.</summary>

```

```

#####

```

```

# Polaris mqipc (infra/mqipc)

```

```

#####

```

```

#####

```

```

## <summary>
##   Make specified domain as one of mqipc types.
## </summary>
## <param name="domain">
##   <summary>
##     The domain serving as polaris_mqipc type
##   </summary>
## </param>
#

```

```

interface(`polaris_mqipc_type`,`
    gen_require(`
        attribute polaris_mqipc;
    `)
    typeattribute $1 polaris_mqipc;
    files_type($1)
)

```

```

#####

```

```

## <summary>
##   Manage mqipc shared memory file in /dev/shm directory
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="mqipc_label">
## <summary>
## Mqipc file label.
## </summary>
## </param>
## <param name="object">
## <summary>
## Mqipc channel file name stem. It is used to derive set of file names
## used by MQIPC.
## </summary>
## </param>
#
interface(`polaris_mqipc_create_name`,`
gen_require(`
type tmpfs_t;
type tmp_t;
`)
manage_files_pattern($1, tmpfs_t, $2)
allow $1 $2:file map;
type_transition $1 tmpfs_t : file $2 "mq.-$3";
manage_fifo_files_pattern($1, tmp_t, $2)
type_transition $1 tmp_t : fifo_file $2 "mq_ene_fifo.-$3";
type_transition $1 tmp_t : fifo_file $2 "mq_fnf_fifo.-$3";
fs_getattr_tmpfs($1)
`)

#####
## <summary>
## Manage mqipc shared memory file in /dev/shm/dir directory
## where dir is also derived from object parameter used as stem. It
## should be used only in cases where mqipc server operates with
## chanell under subdirectory. TDL autogeneration does not pick up
## this so interface call should be added explicitly.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="mqipc_label">
## <summary>
## Database file label.
## </summary>

```

```

## </param>
## <param name="object">
##   <summary>
##     Mqipc file name stem. It is used to derive set of file names
##     used by MQIPC.
##   </summary>
## </param>
#
interface(`polaris_mqipc_create_name_dir`,`
gen_require(`
type tmpfs_t;
    type tmp_t;
`)
manage_files_pattern($1, { tmpfs_t $2 }, $2)
allow $1 $2:file map;
manage_dirs_pattern($1, tmpfs_t, $2)
type_transition $1 tmpfs_t : { file dir } $2 "mq.-$3";
manage_fifo_files_pattern($1, { tmp_t $2 }, $2)
type_transition $1 tmp_t : fifo_file $2 "mq_ene_fifo.-$3";
type_transition $1 tmp_t : fifo_file $2 "mq_fnf_fifo.-$3";
fs_getattr_tmpfs($1)
`)

#####
## <summary>
##   Manage mqipc shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="mqipc_label">
##   <summary>
##     Mqipc channel file label.
##   </summary>
## </param>
#
interface(`polaris_mqipc_use`,`
gen_require(`
type tmpfs_t;
`)
read_files_pattern($1, { tmpfs_t $2 }, $2)
write_files_pattern($1, { tmpfs_t $2 }, $2)
read_fifo_files_pattern($1, { tmp_t $2 }, $2)
write_fifo_files_pattern($1, { tmp_t $2 }, $2)
fs_getattr_tmpfs($1)
allow $1 $2:file map;

```

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismqipc.if

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris issu\_stack Policy Rules.</summary>

#####

## <summary>

## Manage tmp files created by issu\_stack.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <rolecap/>

#

interface(`polaris\_issu\_stack\_tmp\_manage`,`

gen\_require(`

type polaris\_issu\_stack\_tmp\_t;

`)

manage\_files\_pattern(\$1, polaris\_issu\_stack\_tmp\_t, polaris\_issu\_stack\_tmp\_t)

manage\_lnk\_files\_pattern(\$1, polaris\_issu\_stack\_tmp\_t, polaris\_issu\_stack\_tmp\_t)

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissustack.if

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# March 2017, Victor Kamensky

#

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#

## <summary>Polaris Tmp Boot Policy Rules.</summary>

```

#####
# /tmp/sw/boot policy
#####

#####
## <summary>
##   Read /tmp/sw/boot files. Does not cover rmonbifo file under
## /tmp/sw/boot/rmonbifo. For those use polaris_rmonbifo_tmp_read interface
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_tmp_read`,`
gen_require(`
type polaris_boot_tmp_t;
`)
read_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
`)

#####
## <summary>
##   Write /tmp/sw/boot files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_tmp_write`,`
gen_require(`
type polaris_boot_tmp_t;
`)
write_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
`)

#####
## <summary>
##   Map any polaris_boot_tmp_t file, needed during install.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
#
interface('polaris_boot_tmp_map',`
    gen_require(`
        type polaris_boot_tmp_t;
    `)
    allow $1 polaris_boot_tmp_t:file map;
`)

#####
## <summary>
##   Manage /tmp/sw/boot files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_boot_tmp_manage',`
    gen_require(`
        type polaris_boot_tmp_t;
    `)
    manage_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
`)

#####
## <summary>
## Create an polaris_boot_tmp_t object
## in tmpfs_t, tmp_t directories.
##
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
##   The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
##   The name of the object being created.
## </summary>
## </param>
#

```

```

interface(`polaris_boot_tmp_filetrans`,`
gen_require(`
  type polaris_boot_tmp_t;
`)
  fs_tmpfs_filetrans($1, polaris_boot_tmp_t, $2, $3)
  files_tmp_filetrans($1, polaris_boot_tmp_t, $2, $3)
`)

#####
## <summary>
##   Manage partition disk device that contains rommon image.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_rommon_device_manage`,`
  gen_require(`
    type device_t;
    type polaris_rommon_device_t;
 `)
  manage_blk_files_pattern($1, device_t, polaris_rommon_device_t)
  manage_chr_files_pattern($1, device_t, polaris_rommon_device_t)
`)

#####
## <summary>
##   Read partition disk device that contains rommon image.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_rommon_device_read`,`
  gen_require(`
    type device_t;
    type polaris_rommon_device_t;
 `)
  read_blk_files_pattern($1, device_t, polaris_rommon_device_t)
  read_chr_files_pattern($1, device_t, polaris_rommon_device_t)
`)

#####

```

```

## <summary>
##   Manage /bootflash/.prst_sync/reload_info
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_file_manage',`
    gen_require(`
        type polaris_boot_file_t;
    `)
    manage_files_pattern($1, polaris_boot_file_t, polaris_boot_file_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.if

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```

#
# February 2020, Victor Kamensky
#
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#

```

```

policy_module(polariscedgetanman, 1.0);

```

```

# why /usr/binos/conf/cedge-tanman.sh is not described in TDL?

```

```

polaris_process_domain_template(cedge_tanman)

```

```

polaris_boot_tmp_read(polaris_cedge_tanman_t)
polaris_chasfs_read(polaris_cedge_tanman_t)
polaris_cpld_read(polaris_cedge_tanman_t)
polaris_read_debug_conf(polaris_cedge_tanman_t)
polaris_use_btrace_fifo(polaris_cedge_tanman_t)

```

```

corecmd_exec_bin(polaris_cedge_tanman_t)
corecmd_exec_shell(polaris_cedge_tanman_t)
auth_use_nsswitch(polaris_cedge_tanman_t)

```

```

# /tmp/tan handling
type polaris_cedge_tanman_tmp_t;
files_tmp_file(polaris_cedge_tanman_tmp_t)
gen_require(`
    type tmp_t;
`)

```

```

manage_dirs_pattern(polaris_cedge_tanman_t, tmp_t, polaris_cedge_tanman_tmp_t)
manage_fifo_files_pattern(polaris_cedge_tanman_t, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
files_tmp_filetrans(polaris_cedge_tanman_t, polaris_cedge_tanman_tmp_t, dir, "tan")

# calls du -sk /tmp/xml/System
fs_getattr_tmpfs(polaris_cedge_tanman_t)

# work with /tmp/xml
polaris_cedge_xml_tmp_manage(polaris_cedge_tanman_t)

# work with /tmp/tmp
polaris_cedge_tmp_manage(polaris_cedge_tanman_t)

polaris_btrace_tmppub_read(polaris_cedge_tanman_t)

allow polaris_cedge_tanman_t self:capability sys_resource;

# calls nice
allow polaris_cedge_tanman_t self:process setsched;

# runs inotifywait -mrq --format %f: -e moved_to /bootflash/tracelogs
# and removes files in /bootflash/tracelogs
polaris_btrace_persistent_data_manage(polaris_cedge_tanman_t)

# runs ps -eaf
# ps needs access to proc_t
kernel_read_system_state(polaris_cedge_tanman_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_cedge_tanman_t)
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_cedge_tanman_t)

# watch over /bootflash/tracelogs
polaris_btrace_data_watch(polaris_cedge_tanman_t)

# watches over /tmp for /tmp/booted appearance
gen_require(
    type tmp_t;
)
allow polaris_cedge_tanman_t tmp_t:dir watch;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedgetanman.te
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#
# Aug 2020, Sridhar

```

```

#
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#

## <summary>Polaris tlscd process Policy Rules.</summary>

## <summary>
##   Allow the specified domain to manage UDS socket
## files. I.e /tmp/tlscd/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tlscd_uds_manage',`
    gen_require(`
        type polaris_tlscd_uds_t;
    `)

    manage_sock_files_pattern($1, polaris_tlscd_uds_t, polaris_tlscd_uds_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristlscd.if

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dnl

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dnl

dnl Same as Nyquist

dnl

dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`fp', `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`fp', `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/msmaps.m4

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#

# September 2017, Victor Kamensky

#

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#

## <summary>Polaris polarisunconfined Policy Rules.</summary>

#####

## <summary>

## Make the specified type usable

## to be conditionally unconfined.

## </summary>

## <param name="domain">

## <summary>

## Type to be used for conditionally unconfined.

## </summary>

## </param>

#

interface(`polaris\_domain\_storage\_unconfined\_type`,`

gen\_require(`

attribute polaris\_storage\_unconfined\_type;

`)

typeattribute \$1 polaris\_storage\_unconfined\_type;

`)

#####

## <summary>

## Mark domain unconfined, if polaris\_unconfined build

## macro is defined. Or if polaris\_unconfined\_conditional

## macro is defined make domain unconfined only if

## polaris\_unconfined\_all SELinux boolean is set on.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_domain\_maybe\_unconfined`,`

```

ifdef(^ polaris_unconfined',`
    unconfined_domain($1)
`)

ifdef(^ polaris_unconfined_conditional',`
    polaris_domain_storage_unconfined_type($1)

    tunable_policy(^ polaris_unconfined_all',`
        polaris_unconfined_domain($1)
    `)
`)

#implicitly confined domain being made permissive
permissive $1;
`)

#####
## <summary>
## Mark iosd domain unconfined, if polaris_iosd_unconfined
## build macro is defined. Or if polaris_iosd_unconfined_conditional
## macro is defined make domain unconfined only if
## polaris_unconfined_iosd SELinux boolean is set on.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(^ polaris_iosd_maybe_unconfined',`
    ifdef(^ polaris_iosd_unconfined',`
        unconfined_domain($1)
    `)

    ifdef(^ polaris_iosd_unconfined_conditional',`
        polaris_domain_storage_unconfined_type($1)

        tunable_policy(^ polaris_unconfined_iosd',`
            polaris_unconfined_domain($1)
        `)
    `)
`)

#####
## <summary>
## Unconfined access to kernel module resources.
## Like kernel_unconfined but without typeattribute use.

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_kernel_unconfined`,`
gen_require(`
attribute proc_type;
    attribute sysctl_type;
    type kernel_t;
    type unlabeled_t;
    type proc_kcore_t;
    type proc_kmsg_t;
`)

allow $1 { proc_type - proc_kcore_t - proc_kmsg_t } :{ file } ~entrypoint;
allow $1 { proc_type - proc_kcore_t - proc_kmsg_t } :{ dir lnk_file } *;

allow $1 sysctl_type:{ file } ~entrypoint;
allow $1 sysctl_type:{ dir lnk_file } *;

allow $1 kernel_t:system *;

allow $1 unlabeled_t:{ dir lnk_file sock_file fifo_file chr_file blk_file } *;
allow $1 unlabeled_t:file ~entrypoint;
allow $1 unlabeled_t:filesystem *;
allow $1 unlabeled_t:association *;
allow $1 unlabeled_t:packet *;
allow $1 unlabeled_t:process ~{ ptrace transition dyntransition execmem execstack execheap };

# LOOK AT ME
# kernel_load_module($1)
')

#####
## <summary>
## Unconfined access to network objects.
## Like corenet_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## The domain allowed access.
## </summary>
## </param>
#
interface(`polaris_corenet_unconfined`,`

```

```

gen_require(
    attribute node_type;
    attribute netif_type;
    attribute packet_type;
    attribute port_type;
)

allow $1 node_type:node *;
allow $1 netif_type:netif *;
allow $1 packet_type:packet *;
allow $1 port_type:dccp_socket { send_msg rcv_msg name_connect };
allow $1 port_type:tcp_socket { send_msg rcv_msg name_connect };
allow $1 port_type:udp_socket { send_msg rcv_msg };

# Bind to any network address.
allow $1 port_type:{ dccp_socket tcp_socket udp_socket rawip_socket } name_bind;
allow $1 node_type:{ dccp_socket tcp_socket udp_socket rawip_socket } node_bind;

)

#####
## <summary>
## Unconfined access to devices.
## Like dev_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dev_unconfined`,`
gen_require(
    attribute device_node;
        type memory_device_t;
        type mtrr_device_t;
)

allow $1 self:capability sys_rawio;
allow $1 { device_node - memory_device_t } :{ blk_file lnk_file } *;
allow $1 { device_node - memory_device_t } :{ file chr_file } ~{ execmod entrypoint };
allow $1 mtrr_device_t:file ~{ execmod entrypoint };
dev_getattr_all($1)

)

#####

```

```

## <summary>
## Unconfined access to domains.
## Like domain_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_domain_unconfined`,`
gen_require(`
    attribute domain;
`)

# Use/sendto/connectto sockets created by any domain.
allow $1 domain:{ socket_class_set socket key_socket } *;

allow $1 domain:system all_system_perms;
# Use descriptors and pipes created by any domain.
allow $1 domain:fd use;
allow $1 domain:fifo_file rw_file_perms;

allow $1 $1:dbus send_msg;

# Act upon any other process.
allow $1 domain:process ~{ ptrace transition dyntransition execmem execstack execheap setcurrent };
allow $1 domain:process ptrace;

# Create/access any System V IPC objects.
allow $1 domain:{ sem msgq shm } *;
allow $1 domain:msg { send receive };

# For /proc/pid
allow $1 domain:dir list_dir_perms;
allow $1 domain:file rw_file_perms;
allow $1 domain:lnk_file { read_lnk_file_perms ioctl lock };

# act on all domains keys
allow $1 domain:key *;

# pass constraints
# typeattribute $1 can_change_object_identity;
# typeattribute $1 set_curr_context;
# typeattribute $1 process_uncond_exempt;

# mcs_process_set_categories($1)

```

```

# userdom_filetrans_home_content($1)
')

#####
## <summary>
## Unconfined access to files.
## Like files_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_files_unconfined',`
gen_require(`
    attribute file_type;
    type shadow_t;
')

    # Create/access any file in a labeled filesystem;
    allow $1 { file_type - shadow_t }:{ file chr_file } ~{ execmod entrypoint relabelto };
    allow $1 file_type:{ dir lnk_file sock_file fifo_file blk_file } *;
    allow $1 file_type:service *;

    # Mount/unmount any filesystem with the context= option.
    allow $1 file_type:filesystem all_filesystem_perms;
')

#####
## <summary>
## Unconfined access to filesystems
## Like fs_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fs_unconfined',`
gen_require(`
    attribute filesystem_type;
')

    allow $1 filesystem_type:filesystem all_filesystem_perms;

```

```

# Create/access other files. fs_type is to pick up various
# pseudo filesystem types that are applied to both the filesystem
# and its files.
allow $1 filesystem_type:{ file } ~entrypoint;
allow $1 filesystem_type:{ dir lnk_file sock_file fifo_file chr_file blk_file } *;
)

#####
## <summary>
## Unconfined access to the SELinux kernel security server.
## Like selinux_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_selinux_unconfined',`
gen_require(`
    attribute boolean_type;
    type security_t;
    type secure_mode_policyload_t;
)

# use SELinuxfs
allow $1 security_t:dir list_dir_perms;
allow $1 security_t:file rw_file_perms;
allow $1 boolean_type:file read_file_perms;
allow $1 { boolean_type -secure_mode_policyload_t }:file write_file_perms;

# Access the security API.
allow $1 security_t:security ~{ load_policy setenforce setbool setseccommand };

ifdef(`distro_rhel4',`
    # needed for systems without audit support
    auditallow $1 security_t:security setbool;
)

# selinux_set_all_booleans($1)
# selinux_load_policy($1)
# selinux_set_parameters($1)
# selinux_set_enforce_mode($1)
)

```

```
#####
## <summary>
## Make the specified domain unconfined.
## </summary>
## <param name="domain">
## <summary>
## Domain to make unconfined.
## </summary>
## </param>
#
interface(`polaris_unconfined_domain`,`
gen_require(`
class dbus all_dbus_perms;
class nscd all_nscd_perms;
class passwd all_passwd_perms;
`)

# Use any Linux capability.

allow $1 self:capability ~{ sys_module };
allow $1 self:capability2 ~{ mac_admin mac_override };
allow $1 self:fifo_file { manage_fifo_file_perms relabelfrom relabelto };

# Transition to myself, to make get_ordered_context_list happy.
allow $1 self:process { dyntransition transition };

# Write access is for setting attributes under /proc/self/attr.
allow $1 self:file rw_file_perms;
allow $1 self:dir rw_dir_perms;

# Userland object managers
allow $1 self:nscd all_nscd_perms;
allow $1 self:dbus all_dbus_perms;
allow $1 self:passwd all_passwd_perms;
allow $1 self:association all_association_perms;
allow $1 self:socket_class_set create_socket_perms;

polaris_kernel_unconfined($1)
polaris_corenet_unconfined($1)
polaris_dev_unconfined($1)
polaris_domain_unconfined($1)
polaris_files_unconfined($1)
polaris_fs_unconfined($1)
polaris_selinux_unconfined($1)

systemd_config_all_services($1)

# in unconfined_domain_noaudit its under not deny_execmem
```

```

allow $1 self:process execmem;

# domain_mmap_low($1)
#
# ubac_process_exempt($1)
#
# optional_policy(`
# auth_unconfined($1)
# ')
#
# optional_policy(`
# # Communicate via dbusd.
# dbus_system_bus_unconfined($1)
# dbus_unconfined($1)
# ')
#
# optional_policy(`
# ipsec_setcontext_default_spd($1)
# ipsec_match_default_spd($1)
# ')
#
# optional_policy(`
# nscd_unconfined($1)
# ')
#
# optional_policy(`
# seutil_create_bin_policy($1)
# seutil_relabelto_bin_policy($1)
# ')
#
# optional_policy(`
# storage_unconfined($1)
# ')
#
# optional_policy(`
# xserver_unconfined($1)
# ')
')

#####
## <summary>
##   Make the specified domain able to work with cpp /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```
## </param>
#
interface(`polaris_unconfined_service_fifo_file_manage',`
    gen_require(`
        type unconfined_service_t;
    `)

    manage_fifo_files_pattern($1, unconfined_service_t, unconfined_service_t)
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisunconfined.if
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```

```
#
# March 2019, Shikhar Dogra
#
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#
```

```
policy_module(polarisfmancc, 1.0);
```

```
gen_require(`
    type polaris_fman_cc_t;
`)
```

```
polaris_btrace_data_manage(polaris_fman_cc_t)
polaris_crft_data_manage(polaris_fman_cc_t)
polaris_chasfs_manage(polaris_fman_cc_t)
polaris_tdlresolve_read(polaris_fman_cc_t)
polaris_tdlldb_list_dirs(polaris_fman_cc_t)
polaris_cpld_read(polaris_fman_cc_t)
polaris_lua_read(polaris_fman_cc_t)
polaris_flashlib_read(polaris_fman_cc_t)
polaris_cpld_dev_use(polaris_fman_cc_t)
```

```
# allow to send message to /dev/log
logging_send_syslog_msg(polaris_fman_cc_t)
```

```
# ISR Nightwatch module accesses libraries compiled with icc
polaris_icc_broken_relocations(polaris_fman_cc_t)
```

```
# cpp bleeds into switching platforms through fman_fp and fed
# apparently even on nyquist fed creates /tmp/cpp_anon_db
polaris_cpp_process(polaris_fman_cc_t)
polaris_cpp_tmp_files_use(polaris_fman_cc_t)
```

```
type polaris_iosd_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_iosd_fmanrp_mqipc_t)
```

```
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc0)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc1)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc2)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc3)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc4)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmancc.te
```

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dnl

dnl May 2020, Swati Kumari

dnl

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dnl

dnl rpx86 Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
```

```
max_bay_map_set(cc, `per_bay', 5)
```

```
max_bay_map_set(fp, `per_bay', 2)
```

```
min_bay_ripc_map_set(rp, `per_bay', 0)
```

```
min_bay_ripc_map_set(cc, `per_bay', 1)
```

```
min_bay_ripc_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `per_bay', 2)
```

```
max_bay_ripc_map_set(cc, `per_bay', 6)
```

```
max_bay_ripc_map_set(fp, `per_bay', 2)
```

```
min_bay_ripc_map_set(rp, `global', 0)
```

```
min_bay_ripc_map_set(cc, `global', 1)
```

```
min_bay_ripc_map_set(fp, `global', 0)
```

```
max_bay_ripc_map_set(rp, `global', 2)
```

```
max_bay_ripc_map_set(cc, `global', 6)
```

```
max_bay_ripc_map_set(fp, `global', 2)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/rpx86maps.m4
```

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris polarispsvp Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispsvp.if

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#

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#

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#

/tmp/tmppub(/.)\*? gen\_context(system\_u:object\_r:polaris\_btrace\_tmppub\_t,s0)

# btrace utility to rotate logs

/usr/binos/bin/btman\_rotate\_immediate -- gen\_context(system\_u:object\_r:polaris\_btman\_exec\_t,s0)

# btrace utility to dump meta data

/usr/binos/bin/dump\_btrace\_meta -- gen\_context(system\_u:object\_r:polaris\_btman\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtman.fc

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#

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#

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#

policy\_module(polarisnvram, 1.0);

#####

# NVRAM

#####

ifdef(^ngwc\_family',`

# suppose that in edison case nvram is not in partition

type polaris\_nvram\_file\_t;

files\_type(polaris\_nvram\_file\_t)

# allow nvram file reside on persistent storage

polaris\_pfile\_type(polaris\_nvram\_file\_t)

```

)

ifdef(`blackheart_platform',`
gen_require(
    type polaris_nvram_file_t;
    type polaris_iosd_t;
)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
)

ifdef(`sparrow_platform',`
gen_require(
    type polaris_nvram_file_t;
    type polaris_iosd_t;
)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
)

ifdef(`aventus_platform',`
gen_require(
    type polaris_nvram_file_t;
    type polaris_iosd_t;
)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
)

ifdef(`cabo_platform',`
gen_require(
    type polaris_nvram_file_t;
    type polaris_iosd_t;
)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
)

ifdef(`petra_platform',`
type polaris_nvram_file_t;

```

```

files_type(polaris_nvram_file_t)
# suppose that in edison case nvram is not in partition
gen_require(
    type polaris_iosd_t;
)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnvram.te
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```

```

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#

```

```

## <summary>Polaris cxp Policy Rules.</summary>

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscxp.if
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```

```

#
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#

```

```

policy_module(polarischasfs, 1.0);

```

```

#####
# Chasfs policy
#####
gen_require(
    attribute domain;
)

```

```

type polaris_chasfs_t;
files_type(polaris_chasfs_t)

```

```

files_tmp_filetrans(domain, polaris_chasfs_t, dir, "chassis")
files_tmp_filetrans(domain, polaris_chasfs_t, lnk_file, "chasfs")

```

```

# LOOK AT ME: on ultra /tmp/cc/chasfs is created as directory, but
# on other platforms it is symbolic to /tmp/chassis/local/cc/chasfs
# as it happens for rp and fp. Would it be better to fix ultra
# script(s)?
files_tmp_filetrans(domain, polaris_chasfs_t, dir, "chasfs")

# cpld-symlink.service, creates /tmp/chassis while /tmp is
# still tmpfs_t, ie before systemd-tmpfiles runs and had a
# chance to set tmp_t label on /tmp
gen_require(
    type initrc_t;
)
fs_tmpfs_filetrans(initrc_t, polaris_chasfs_t, dir, "chassis")

init_script_tmp_filetrans(domain, polaris_chasfs_t, dir, "chasfs")

#####
# chasync
#####

polaris_process_domain_template(chasync)

corecmd_exec_bin(polaris_chasync_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_chasync_t)

polaris_btrace_data_manage(polaris_chasync_t)
polaris_chasfs_manage(polaris_chasync_t)
polaris_cpld_read(polaris_chasync_t)
polaris_boot_tmp_read(polaris_chasync_t)
polaris_read_debug_conf(polaris_chasync_t)
polaris_rmonbifo_tmp_read(polaris_chasync_t)
polaris_proc_rmonbifo_read(polaris_chasync_t)

polaris_disk_bootflash_read_lnk(polaris_chasync_t)
polaris_disk_hddisk_read_lnk(polaris_chasync_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_chasync_t)

allow polaris_chasync_t self:capability sys_resource;
allow polaris_chasync_t self:process setpgid;

# access of crashinfo dir for the domain
polaris_disk_crashinfo_getattr(polaris_chasync_t)

# allow access of /tmp/rp/chasync for the polaris chasync_t domain to

```

```

# create/write/read dirs/files with domain specific context
type polaris_chasync_tmp_t;
files_type(polaris_chasync_tmp_t)
files_tmp_file(polaris_chasync_tmp_t)
files_tmp_filetrans(polaris_chasync_t, polaris_chasync_tmp_t, dir, "chasync")
manage_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)
manage_fifo_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)

# allow creation/access of temporary files created by chasync.sh like
# /tmp/sh-thd-1499428203 etc
files_tmp_filetrans(polaris_chasync_t, polaris_chasync_tmp_t, file)
manage_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)

fs_getattr_tmpfs(polaris_chasync_t)

# access of flash util for the domain
polaris_flashlib_read(polaris_chasync_t)

# read /proc/cmdline
kernel_read_system_state(polaris_chasync_t)

gen_require(
    type rsync_t;
    type init_t;
    type rsync_tmp_t;
)
rsync_entry_domtrans(polaris_chasync_t, rsync_t)
allow rsync_t polaris_chasync_t:process sigchld;
# file descriptor leak when rsync is called
allow rsync_t init_t:unix_stream_socket ioctl;

# upon exec rsync inherits chasync's stdout/stderr fifo files
allow rsync_t polaris_chasync_t:fifo_file { getattr write };
# in chasync_prepost_rsync.sh, CHASYNC_PID_DIR (rsync pid files) is deleted by rsync
fs_getattr_tmpfs(rsync_t)

# allow file:map for rsync_tmp_t
allow rsync_t rsync_tmp_t:file map;
dev_getattr_generic_blk_files(rsync_t)
dev_getattr_loop_control(rsync_t)
# need access to /usr/bin/mount
mount_entry_type(rsync_t)
# need access to dev/sda1
storage_getattr_fixed_disk_dev(rsync_t)
ifdef(`ngwc_family',`

#Read and write RPC sysctls

```

```

kernel_rw_rpc_sysctls(rsync_t)
mount_domtrans(rsync_t)
fstools_domtrans(rsync_t)
#Create/read/write on fixed device disk nodes
storage_manage_fixed_disk(rsync_t)
#stat -f -L -c %T /mnt/usb0
polaris_getattr_removable(rsync_t)
storage_filetrans_all_named_dev(rsync_t)
')
#===== polaris_dyncfg =====
polaris_dyncfg_tmp_read(rsync_t)

#===== polaris_chasync_t =====
polaris_btrace_persistent_data_search(polaris_chasync_t)
#chasync.sh code executes mv command
allow polaris_chasync_t self:process { setfscreate };
#chasync.sh code executes ping command to check if ping works before trying rsync for the first time
netutils_domtrans_ping(polaris_chasync_t)

#chasync.sh code in wlc saves logs during cleanup to /var/log/chasync
type polaris_chasync_log_t;
logging_log_file(polaris_chasync_log_t)
manage_files_pattern(polaris_chasync_t, polaris_chasync_log_t, polaris_chasync_log_t)
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_log_t, polaris_chasync_log_t)
logging_log_filetrans(polaris_chasync_t, polaris_chasync_log_t, dir, "chasync")

#####
# chasfs_boottime script
#####

polaris_process_domain_template(chasfs_boottime)

unconfined_domain(polaris_chasfs_boottime_t)

# chasfs_boottime.sh starts cman_fp or cmand with -C option; allow its
# transition to fman_fp_t type
optional_policy(`
polaris_cm_rp_domtrans(polaris_chasfs_boottime_t)
`)
optional_policy(`
polaris_cm_fp_domtrans(polaris_chasfs_boottime_t)
`)
optional_policy(`
polaris_cm_cc_domtrans(polaris_chasfs_boottime_t)
`)

ifdef(`ngwc_family',`

```

```

# Allow iox_polaris.conf read
polaris_caf_files_read(polaris_chasync_t)

# Allow losetup in helper script
fstools_domtrans(polaris_chasync_t)

# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_chasync_t)

#Allow console logging
term_open_unallocated_ttys(polaris_chasync_t)

# Allow logger which is used for syslog message
allow polaris_chasync_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_chasync_t)

# logger needs to run pidof
dev_read_sysfs(polaris_chasync_t)
domain_read_all_domains_state(polaris_chasync_t)

)

type polaris_chasync_files_t;
files_type(polaris_chasync_files_t)
polaris_pfile_type(polaris_chasync_files_t)

optional_policy(
  gen_require(
    type polaris_disk_hddisk_t;
    type polaris_disk_bootflash_t;
  )
  filetrans_pattern(polaris_chasync_t, {polaris_disk_bootflash_t polaris_disk_hddisk_t}, polaris_chasync_files_t,
  dir, "sys_report")
  filetrans_pattern(polaris_chasync_t, {polaris_disk_bootflash_t polaris_disk_hddisk_t}, polaris_chasync_files_t,
  dir, "fp_cc_crash")
  filetrans_pattern(polaris_chasync_t, polaris_disk_bootflash_t, polaris_chasync_files_t, file,
  "user_input_custom.xml")

# chasync can manage files inside of its own polaris_disk_chasync_t directories
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_files_t, polaris_chasync_files_t)
manage_files_pattern(polaris_chasync_t, polaris_chasync_files_t, polaris_chasync_files_t)
allow polaris_chasync_t polaris_chasync_files_t:dir watch;
polaris_install_disk_read(polaris_chasync_t)
)

optional_policy(
# chansync invoked sys_report does ls /tmp/ufs/crashinfo

```

```

polaris_ncd_tmp_read(polaris_chasync_t)
')

# chasync moves inv files from /tftp/inv to chasfs directory
allow polaris_chasync_t self:capability { chown fowner fsetid };
gen_require(
type brctl_t;
)
# pd_iox.sh invokes brctl which needs access to chasfs
polaris_chasfs_read(brctl_t)

#allow chasync to unmount flash partition
mount_domtrans(polaris_chasync_t)

sysnet_domtrans_ifconfig(polaris_chasync_t)

# chasync.sh needs read access to /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_chasync_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarischasfs.te
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#
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#
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#

policy_module(polariscpp, 1.0);

#####
# Polaris cpp (ultra)
#####

type polaris_cpp_device_t;
dev_node(polaris_cpp_device_t)

# deals with /dev/shm files semaphors, etc
type polaris_cpp_tmpfs_t;
files_tmpfs_file(polaris_cpp_tmpfs_t)
attribute polaris_cpp_domain;
fs_tmpfs_filetrans(polaris_cpp_domain, polaris_cpp_tmpfs_t, file)
manage_files_pattern(polaris_cpp_domain, tmpfs_t, polaris_cpp_tmpfs_t)
allow polaris_cpp_domain polaris_cpp_tmpfs_t:file map;
polaris_cpp_tmpfs_manage(polaris_cpp_domain)
polaris_cerr_shm_manage(polaris_cpp_domain)

```

```

# on TSN ucode_dram lives in hugetlbfs
fs_hugetlbfs_filetrans(polaris_cpp_domain, polaris_cpp_tmpfs_t, file)
gen_require(
    type hugetlbfs_t;
)
manage_files_pattern(polaris_cpp_domain, hugetlbfs_t, polaris_cpp_tmpfs_t)

# deals with cpp /tmp files
type polaris_cpp_tmp_t;
files_tmp_file(polaris_cpp_tmp_t)
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, file, "cpp_anon_db")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, file, "qm_rt_dbg")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, fifo_file, "cpp_ifdev_rep")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, fifo_file, "cpp_ifdev_req")
manage_files_pattern(polaris_cpp_domain, tmp_t, polaris_cpp_tmp_t)
manage_fifo_files_pattern(polaris_cpp_domain, tmp_t, polaris_cpp_tmp_t)
allow polaris_cpp_domain polaris_cpp_tmp_t:file map;

fs_getattr_tmpfs(polaris_cpp_domain)

# overlord/neptune access /sys/bus/pci/devices/0000:01:00.0/resource0
# when initializing the CPP DMAP library
optional_policy(
    polaris_cpp_cavium_dma_map(polaris_cpp_domain)
)

type polaris_i95_device_t;
dev_node(polaris_i95_device_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscpp.te
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#

# some platforms have /usr/binos/bin/fman_fp as hardlink to
# /usr/binos/bin/fman_fp_image
/usr/binos/bin/fman_fp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_vwlc_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_us_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.fc

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#

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#

## <summary>Polaris ngiolite Policy Rules.</summary>

#####

## <summary>

## Execute mcp\_smartctl\_cmds.sh in the polaris\_smartctl domain.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed to transition.

## </summary>

## </param>

#

interface(`polaris\_smartctl\_domtrans`,`

gen\_require(`

type polaris\_smartctl\_t, polaris\_smartctl\_exec\_t;

`)

corecmd\_search\_bin(\$1)

domtrans\_pattern(\$1, polaris\_smartctl\_exec\_t, polaris\_smartctl\_t)

')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngiolite.if

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#

# February 2018, Manohar Hungund

#

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#

/dev/act2 -c gen\_context(system\_u:object\_r:polaris\_act2\_device\_t,s0)

/tmp/hw\_entropy -- gen\_context(system\_u:object\_r:polaris\_hw\_entropy\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisact2.fc

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#

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#

policy\_module(polarismcc, 1.0);

gen\_require(`

type polaris\_cm\_cc\_t;

`)

polaris\_btrace\_data\_manage(polaris\_cm\_cc\_t)

polaris\_crft\_data\_manage(polaris\_cm\_cc\_t)

polaris\_chasfs\_manage(polaris\_cm\_cc\_t)

polaris\_tdlresolve\_read(polaris\_cm\_cc\_t)

polaris\_tdlldb\_list\_dirs(polaris\_cm\_cc\_t)

polaris\_cpld\_read(polaris\_cm\_cc\_t)

polaris\_lua\_read(polaris\_cm\_cc\_t)

polaris\_flashlib\_read(polaris\_cm\_cc\_t)

polaris\_cpld\_dev\_use(polaris\_cm\_cc\_t)

polaris\_proc\_rmonbifo\_read(polaris\_cm\_cc\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_cm\_cc\_t)

optional\_policy(`

# access to /dev/iocp0

polaris\_spa\_dev\_use(polaris\_cm\_cc\_t)

`)

optional\_policy(`

# access to /dev/htdb[0-9]\*

polaris\_htdp\_dev\_use(polaris\_cm\_cc\_t)

`)

# read /proc/cmdline

kernel\_read\_system\_state(polaris\_cm\_cc\_t)

# work with /dev/i2c devices

polaris\_i2c\_use(polaris\_cm\_cc\_t)

polaris\_obfl\_data\_read(polaris\_cm\_cc\_t)

# cmcc module as part of init calls cmem\_obfl\_write\_voltage\_log(),

# which writes to obfl device.

polaris\_obfl\_data\_manage(polaris\_cm\_cc\_t)

# on vxe platform /obfl is symlink to /varied

```

ifdef(`vxe_family',`
polaris_disk_varied_list(polaris_cm_cc_t)
')

# on 1ng works with /dev/cpld-virtual-cc
polaris_cpp_dev_use(polaris_cm_cc_t)

polaris_i2c_use(polaris_cm_cc_t)
dev_rw_sysfs(polaris_cm_cc_t)

ifdef(`crankshaft_family',`
# read,getattr, map access to /firmware/ files for Switzer-CC
polaris_firmware_read(polaris_cm_cc_t)
polaris_firmware_getattr(polaris_cm_cc_t)
polaris_firmware_map(polaris_cm_cc_t)
')

# allow objstore access
polaris_disk_objstore_read(polaris_cm_cc_t)

# get interface address cmlib_if_config_addr at cman/lib/cmlib_msgs/src/cmlib_eobc.c
allow polaris_cm_cc_t self:udp_socket { create ioctl };

# on utah need to get model info
optional_policy(`
    polaris_dash_dev_use(polaris_cm_cc_t)
')

#access to /dev/dash_fpga device on fugazi platform
ifdef(`fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_cm_cc_t)
')

#access to /dev/nutella_fpga device on nutella platform
optional_policy(`
polaris_nutella_fpga_dev_use(polaris_cm_cc_t)
')

# handle /tmp/pci files on utah
type polaris_pci_tmp_t;
files_tmp_file(polaris_pci_tmp_t)
# /tmp/pci/bus, /tmp/pci/vendor, /tmp/pic/device created by systemd unit
gen_require(`
    type initrc_t;
    type unconfined_service_t;
    type tmp_t;
')
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_pci_tmp_t, dir, "pci")

```

```

manage_dirs_pattern(initrc_t, tmp_t, polaris_pci_tmp_t)
manage_files_pattern(initrc_t, polaris_pci_tmp_t, polaris_pci_tmp_t)
manage_files_pattern(polaris_cm_cc_t, polaris_pci_tmp_t, polaris_pci_tmp_t)

logging_send_syslog_msg(polaris_cm_cc_t)

# cmcc module creates the PCI rescan shm mutex.
# /dev/shm/rescan_shm file.
type polaris_cm_cc_tmpfs_t;
files_tmpfs_file(polaris_cm_cc_tmpfs_t)
fs_tmpfs_filetrans(polaris_cm_cc_t, polaris_cm_cc_tmpfs_t, file)
manage_files_pattern(polaris_cm_cc_t, tmpfs_t, polaris_cm_cc_tmpfs_t)
mmap_files_pattern(polaris_cm_cc_t, tmpfs_t, polaris_cm_cc_tmpfs_t)
dev_read_sysfs(polaris_cm_cc_t)
dev_getattr_sysfs_fs(polaris_cm_cc_t)
fs_getattr_tmpfs(polaris_cm_cc_t)

# /tmp/udev-cc should it not be polaris_udev_tmp_t
type polaris_cm_cc_tmp_t;
files_tmp_file(polaris_cm_cc_tmp_t)
files_tmp_filetrans(polaris_cm_cc_t, polaris_cm_cc_tmp_t, dir, "udev-cc")
manage_files_pattern(polaris_cm_cc_t, polaris_cm_cc_tmp_t, polaris_cm_cc_tmp_t)
gen_require(`
    type tmp_t;
`)
manage_dirs_pattern(polaris_cm_cc_t, { tmp_t polaris_cm_cc_tmp_t }, polaris_cm_cc_tmp_t)

# on tsn need access to /dev/moka_fpga
optional_policy(`
polaris_mokafpga_dev_use(polaris_cm_cc_t)
`)

optional_policy(`
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_cc_t)
`)

# on macallan need access to /dev/quack
optional_policy(`
polaris_quack_dev_use(polaris_cm_cc_t)
`)

polaris_cpld_write(polaris_cm_cc_t)

optional_policy(`
# on starfleet access gettysburg_fpga
polaris_gettysburg_fpga_dev_use(polaris_cm_cc_t)
`)

```

```

# /dev/epactrlN on qwlc
optional_policy(`
polaris_epa_dev_use(polaris_cm_cc_t)
`)

# /dev/luna_fpga on qwlc
optional_policy(`
polaris_luna_mbfpga_dev_use(polaris_cm_cc_t)
`)

# /dev/astro on qwlc
optional_policy(`
polaris_astro_dev_use(polaris_cm_cc_t)
`)

# /dev/huron_fpga on Sumatra
optional_policy(`
polaris_huron_dev_use(polaris_cm_cc_t)
`)

type polaris_nim_xxd_tmp_t;
files_tmp_file(polaris_nim_xxd_tmp_t)
files_tmp_filetrans(polaris_cm_cc_t, polaris_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_cm_cc_t, polaris_nim_xxd_tmp_t, polaris_nim_xxd_tmp_t)
ifdef(`starfleet_platform',`
# In cman_cc
# cmcc_starfleet_act2_authentication_udi in cman/cc/src/cmcc_starfleet.c
# cmcc_starfleet_cpupboard_act2_authentication_udi cman/cc/src/cmcc_starfleet.c
# tam_lib_device_open infra/act2/tam_act2/tam_lib/src/tam_lib_device.c:
polaris_act2_dev_use(polaris_cm_cc_t)
`)

ifdef(`crankshaft_family',`
# modprobe sm_nim_adpt.ko for Switzer-CC
modutils_domtrans_insmod(polaris_cm_cc_t)
# /dev/sm_nim_adpt device files for Switzer-CC
polaris_sm_nim_adpt_dev_use(polaris_cm_cc_t)
`)

# Mapping permission for /dev/shm/<name>
ifdef(`crankshaft_family',`
gen_require(`
type systemd_tmpfiles_t;
`)
mmap_files_pattern(systemd_tmpfiles_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

```

```

# on ngwc cmcc needs to access /dev/chdrvmmmap for asic memory mapping
optional_policy(
polaris_chdrvmmmap_dev_use(polaris_cm_cc_t)
')

ifdef(`vxe_family',`
# bind to BMC_AGENT_CLIENT_PORT port from cman_tlv_init
corenet_tcp_bind_polaris_bmc_agent_client_port(polaris_cm_cc_t)
')

# allow /usr/binos/bin/cmcc to access /tmp/hd_sz
gen_require(
    type udev_tmp_t;
)
read_files_pattern(polaris_cm_cc_t, udev_tmp_t, udev_tmp_t)

# allow /usr/sbin/smartctl to be operated on fsadm_exec_t
fstools_exec(polaris_cm_cc_t)

# using existing interface "polaris_cm_rp_tmp_manage" for polaris_cm_cc_t
# to acces /tmp/cmlib_eeprom_sim_smartctl.out
polaris_cm_rp_tmp_manage(polaris_cm_cc_t)
files_tmp_filetrans(polaris_cm_cc_t, polaris_cm_rp_tmp_t, file, "cmlib_eeprom_sim_smartctl.out")

# allow access to /dev/nvme*
dev_nvme_chr_files_manage(polaris_cm_cc_t)
dev_nvme_blk_files_manage(polaris_cm_cc_t)

# access to /dev/ttyS0
term_use_unallocated_ttys(polaris_cm_cc_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmcc.te

No license file was found, but licenses were detected in source scan.

```

#
# June 2017, Victor Kamensky
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#

```

## <summary>Polaris tservice Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristervice.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#

## <summary>Polaris polarissortfiles Policy Rules.</summary>
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissortfiles.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
# All rights reserved
#

## <summary>Polaris Storage Policy Rules.</summary>
```

```
#####
# Persistent storage policy
#####
```

```
#####
## <summary>
## Make the specified type usable as default type for files
## in a Polaris persistent (bootflash, harddisk, etc) filesystem.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
```

```
#
interface(`polaris_disk_type',`
    files_type($1)
    gen_require(`
        attribute polaris_disk;
    `)
    typeattribute $1 polaris_disk;
`)
```

```
#####
```

```

## <summary>
## Make the specified type usable for files
## in a Polaris persistent (bootflash, harddisk, etc)
## filesystem.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
interface(`polaris_pfile_type`,`
    files_type($1)
    gen_require(`
        attribute polaris_disk;
    `)
    typeattribute $1 polaris_disk;
`)

#####
## <summary>
## Read any regular file/directory from persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_persistent_read`,`
    gen_require(`
        attribute polaris_disk;
    `)
    read_files_pattern($1, polaris_disk, polaris_disk)
    read_lnk_files_pattern($1, polaris_disk, polaris_disk)
    list_dirs_pattern($1, polaris_disk, polaris_disk)
`)

#####
## <summary>
## Getattr of any regular file/directory from persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_persistent_getattr`,`
    gen_require(`
        attribute polaris_disk;
    `)
    list_dirs_pattern($1, polaris_disk, polaris_disk)
    getattr_files_pattern($1, polaris_disk, polaris_disk)
    getattr_lnk_files_pattern($1, polaris_disk, polaris_disk)
`)

```

```
#####
```

```

## <summary>
## Listdir of any regular directory from persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_persistent_list_dirs`,`
    gen_require(`
        attribute polaris_disk;
    `)
    list_dirs_pattern($1, polaris_disk, polaris_disk)
`)

```

```
#####
```

```

## <summary>
## Write/read any regular file/directory from persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_persistent_manage`,`
    gen_require(`
        attribute polaris_disk;
    `)
    manage_files_pattern($1, polaris_disk, polaris_disk)
    manage_dirs_pattern($1, polaris_disk, polaris_disk)
    manage_lnk_files_pattern($1, polaris_disk, polaris_disk)
`)

```

```
#####
```

```
## <summary>
```

```

## Map any regular file/directory from persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_persistent_map`,`
    gen_require(`
        attribute polaris_disk;
    `)
    allow $1 polaris_disk:file map;
`)

#####
# debug.conf
#####

#####
## <summary>
## Read debug.conf from persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_debug_conf`,`
    gen_require(`
        type polaris_debug_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type tmp_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_debug_conf_t)
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_debug_conf_t)
    read_files_pattern($1, tmp_t, polaris_debug_conf_t)
    read_lnk_files_pattern($1, tmp_t, polaris_debug_conf_t)
    polaris_disk_bootflash_read_lnk($1)
`)

#####
# packages.conf
#####

#####

```

```

## <summary>
## Read packages.conf from persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_packages_conf`,`
    gen_require(`
        type polaris_packages_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_packages_conf_t)
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_packages_conf_t)
`)

#####
## <summary>
## Manage packages.conf in persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_manage_packages_conf`,`
    gen_require(`
        type polaris_packages_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
    `)
    manage_files_pattern($1, polaris_disk_bootflash_t, polaris_packages_conf_t)
    manage_files_pattern($1, polaris_disk_harddisk_t, polaris_packages_conf_t)
`)

#####
## <summary>
##   Write/read any regular file/directory from /varied
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```
#
interface(`polaris_disk_varied_manage`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    manage_files_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)
```

```
#####
```

```
## <summary>
##   read any regular file/directory from /varied
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_disk_varied_read`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    read_files_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
    list_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)
```

```
#####
```

```
#####
```

```
## <summary>
##   Search /varied directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_disk_varied_search`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    search_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)
```

```
#####
```

```
#####
```

```
## <summary>
##   List/read /varied directory
```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_varied_list`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    list_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)

```

```
#####
```

```

## <summary>
## Write/read/remove polaris_core_file_t file/directory from
## persistent storage.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_core_file_manage`,`
    gen_require(`
        type polaris_core_file_t;
    `)
    allow $1 polaris_core_file_t:dir rmdir;
    manage_files_pattern($1, polaris_core_file_t, polaris_core_file_t)

    allow $1 polaris_core_file_t:dir watch;
`)

```

```
#####
```

```

## <summary>
## Search polaris_core_file_t dir
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_core_file_search`,`
    gen_require(`
        type polaris_core_file_t;
    `)

```

```

    ')
    search_dirs_pattern($1, polaris_core_file_t, polaris_core_file_t)
    ')

#####
## <summary>
## Read/Open/Search polaris_core_file_t dir
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_core_file_read`,`
    gen_require(`
        type polaris_core_file_t;
    `)
    allow $1 polaris_core_file_t:dir read;
    getattr_files_pattern($1, polaris_core_file_t, polaris_core_file_t)
    ')

#####
## <summary>
## Get attrib of bootflash fifo file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_bootflash_fifo_file_getattr`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    getattr_fifo_files_pattern($1, polaris_disk_bootflash_t,
        polaris_disk_bootflash_t)
    ')

#####
## <summary>
## Get attrib of bootflash sock file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
#
interface(`polaris_disk_bootflash_sock_file_getattr`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    getattr_sock_files_pattern($1, polaris_disk_bootflash_t,
        polaris_disk_bootflash_t)
`)

#####
## <summary>
## Read links of polaris_disk_bootflash_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_bootflash_read_lnk`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
`)

#####
## <summary>
## Search polaris_disk_bootflash_t dir
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_bootflash_search`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    search_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
`)

#####
## <summary>
## Write/read any regular file/directory under /csl_p_0/, /csl_p_1,

```

```

## /csl_s_0, and /csl_s_1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_csl_manage`,`
  gen_require(`
    type polaris_disk_csl_p_t;
    type polaris_disk_csl_s_t;
  `)
  manage_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
  manage_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
  read_lnk_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
  read_lnk_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
`)

```

```

#####
## <summary>
## Write/read any regular file/directory under /csl_p_0/, /csl_p_1,
## /csl_s_0, and /csl_s_1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_csl_read`,`
  gen_require(`
    type polaris_disk_csl_p_t;
    type polaris_disk_csl_s_t;
  `)
  read_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
  read_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
  read_lnk_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
  read_lnk_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
`)

```

```

#####
## <summary>
## Write/read any regular file/directory under /objstore,
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_disk_objstore_manage`,`
    gen_require(`
        type polaris_disk_objstore_t;
    `)
    manage_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
    read_lnk_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
`)

interface(`polaris_disk_objstore_read`,`
    gen_require(`
        type polaris_disk_objstore_t;
    `)
    read_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
    list_dirs_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
`)

#####
## <summary>
## Read links of polaris_disk_harddisk_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_harddisk_read_lnk`,`
    gen_require(`
        type polaris_disk_harddisk_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
`)

#####
## <summary>
## Read harddisk files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_harddisk_read`,`
    gen_require(`

```

```

        type polaris_disk_harddisk_t;
    ')
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
    list_dirs_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
')

#####
## <summary>
##   Read bootflash files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_bootflash_read`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    read_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    list_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
')

#####
## <summary>
##   Manage bootflash files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_bootflash_manage`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    manage_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    manage_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
')

#####
## <summary>
## Create an object in the polaris_disk_bootflash_t directories,

```

```

## with a private type using a type transition.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_bootflash_filetrans`,`
gen_require(`
type polaris_disk_bootflash_t;
`)

filetrans_pattern($1, polaris_disk_bootflash_t, $2, $3, $4)
`)

#####
## <summary>
## Manage bootflash files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_harddisk_manage`,`
gen_require(`
type polaris_disk_harddisk_t;
`)
manage_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
manage_lnk_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
manage_dirs_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)

```

)

```
#####  
## <summary>  
## Create an object in the polaris_disk_harddisk_t directories,  
## with a private type using a type transition.  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>  
## <param name="private type">  
## <summary>  
## The type of the object to be created.  
## </summary>  
## </param>  
## <param name="object">  
## <summary>  
## The object class of the object being created.  
## </summary>  
## </param>  
## <param name="name" optional="true">  
## <summary>  
## The name of the object being created.  
## </summary>  
## </param>  
#  
interface(`polaris_harddisk_filetrans`,`  
  gen_require(`  
    type polaris_disk_harddisk_t;  
  `)  
  
  filetrans_pattern($1, polaris_disk_harddisk_t, $2, $3, $4)  
`)  
)
```

```
#####  
## <summary>  
## Getattr of polaris_disk_crashinfo_t (typically /crashinfo  
## symbolic link and real disk it points to)  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>  
#
```

```

interface(`polaris_disk_crashinfo_getattr`,`
    gen_require(`
        type polaris_disk_crashinfo_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
    getattr_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
    getattr_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
    getattr_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
)

```

```

#####
## <summary>
## Manage polaris_disk_crashinfo_t (typically /crashinfo
## symbolic link and real disk it points to)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_disk_crashinfo_manage`,`
    gen_require(`
        type polaris_disk_crashinfo_t;
    `)
    manage_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
    manage_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
    manage_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
)

```

```

#####
## <summary>
## Read links of polaris_disk_crashinfo_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_disk_crashinfo_read_lnk`,`
    gen_require(`
        type polaris_disk_crashinfo_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
)

```

```
#####
## <summary>
## Write/read polaris_disk_license_t files/directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_license_manage`,`
  gen_require(`
    type polaris_disk_license_t;
  `)
  manage_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
  manage_lnk_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
  allow $1 polaris_disk_license_t:file map;
)`)

```

```
#####
## <summary>
## Fead polaris_disk_license_t files/directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_license_read`,`
  gen_require(`
    type polaris_disk_license_t;
  `)
  read_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
  read_lnk_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
)`)

```

```
#####
## <summary>
##   Get the attributes of an removable
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_getattr_removable`,`
  gen_require(`
    type removable_t;
  `)

  allow $1 removable_t:filesystem getattr;
  allow $1 removable_t:dir    getattr;
`)

#####
## <summary>
##   Create, read, write, and delete all removable files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_removable_manage`,`
  gen_require(`
    type removable_t;
  `)

  manage_files_pattern($1, removable_t, removable_t)
  manage_dirs_pattern($1, removable_t, removable_t)
`)

#####
## <summary>
##   read all removable files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_removable_read`,`
  gen_require(`
    type removable_t;
  `)

  read_files_pattern($1, removable_t, removable_t)
  list_dirs_pattern($1, removable_t, removable_t)
  read_lnk_files_pattern($1, removable_t, removable_t)
`)

#####

```

```

## <summary>
##   Get the attributes of silent roll partition
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_filesystem_disk_ucose`,`
    gen_require(
        type polaris_disk_ucose_t;
    )

    allow $1 polaris_disk_ucose_t:filesystem getattr;
`)

```

```
#####
```

```

## <summary>
##   Get the attributes of an bootflash
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_bootflash`,`
    gen_require(
        type polaris_disk_bootflash_t;
    )

    allow $1 polaris_disk_bootflash_t:filesystem getattr;
`)

```

```
#####
```

```

## <summary>
##   Get the attributes of an harddisk
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_getattr_harddisk`,`
  gen_require(`
    type polaris_disk_harddisk_t;
  `)

  allow $1 polaris_disk_harddisk_t:filesystem getattr;
`)

#####
## <summary>
##   Get the attributes of an harddisk
##   file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_file_harddisk`,`
  gen_require(`
    type polaris_disk_harddisk_t;
  `)
  getattr_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
`)

#####
## <summary>
##   Watch persistent file or directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_persistent_watch`,`
  gen_require(`
    attribute polaris_disk;
  `)
  allow $1 polaris_disk: { dir file } watch;
`)

#####
## <summary>
##   Create an object in the polaris_disk_crashinfo_t directories,
##   with a private type using a type transition.

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_crashinfo_filetrans`,`
    gen_require(`
        type polaris_disk_crashinfo_t;
    `)

    filetrans_pattern($1, polaris_disk_crashinfo_t, $2, $3, $4)
`)

#####
## <summary>
## Get the attributes of an polaris_disk_config_t
## file or directory.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_getattr_disk_config`,`
    gen_require(`
        type polaris_disk_config_t;
    `)

    getattr_files_pattern($1, polaris_disk_config_t, polaris_disk_config_t)
    getattr_dirs_pattern($1, polaris_disk_config_t, polaris_disk_config_t)
`)

```

```
#####
## <summary>
## Create an object in the polaris_disk_config_t directories,
## with a private type using a type transition.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_disk_config_filetrans`,`
gen_require(`
type polaris_disk_config_t;
`)

filetrans_pattern($1, polaris_disk_config_t, $2, $3, $4)
`)

```

```
#####
## <summary>
## Manage bootflash files mmap
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bootflash_files_mmap`,`
gen_require(`
type polaris_disk_bootflash_t;
`)

```

```
)  
  mmap_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstorage.if
```

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```
#
```

```
# March 2020, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisjvm, 1.0);
```

```
gen_require(  
  type polaris_jvm_t;
```

```
)
```

```
# access /etc/passwd
```

```
auth_use_nsswitch(polaris_jvm_t)
```

```
# java through posix_sysconf accesses /sys/devices/system/cpu
```

```
# to get number of CPUs
```

```
dev_read_sysfs(polaris_jvm_t)
```

```
# checks whether IPV6 is configured accessing /proc/pid/net/if_inet6
```

```
kernel_read_network_state(polaris_jvm_t)
```

```
# handling ~/.oracle_jre_usage
```

```
type polaris_jvm_home_t;
```

```
files_type(polaris_jvm_home_t)
```

```
gen_require(  
  type user_home_dir_t;
```

```
)
```

```
filetrans_pattern(polaris_jvm_t, user_home_dir_t, polaris_jvm_home_t, dir, ".oracle_jre_usage")  
manage_dirs_pattern(polaris_jvm_t, user_home_dir_t, polaris_jvm_home_t)
```

```
manage_files_pattern(polaris_jvm_t, polaris_jvm_home_t, polaris_jvm_home_t)
```

```
# handling /tmp/hisperfdata_root
```

```
type polaris_jvm_tmp_t;
```

```
files_type(polaris_jvm_tmp_t)
```

```
gen_require(  
  type tmp_t;
```

```
)
```

```
files_tmp_filetrans(polaris_jvm_t, polaris_jvm_tmp_t, dir, "hisperfdata_root")
```

```

manage_dirs_pattern(polaris_jvm_t, tmp_t, polaris_jvm_tmp_t)
manage_files_pattern(polaris_jvm_t, polaris_jvm_tmp_t, polaris_jvm_tmp_t)
mmap_files_pattern(polaris_jvm_t, polaris_jvm_tmp_t, polaris_jvm_tmp_t)

# listen on 9093 websocket tcp port
corenet_tcp_bind_polaris_poljvm_websocket_port(polaris_jvm_t)
corenet_tcp_bind_generic_node(polaris_jvm_t)
allow polaris_jvm_t self:tcp_socket create_stream_socket_perms;

# java uses jit and needs executable anonymous mapping
allow polaris_jvm_t self:process execmem;

# Allow JDK access to read cpu and memory utilization data on start up
gen_require(
    type proc_t;
)

allow polaris_jvm_t proc_t:file { getattr open read };
fs_read_cgroup_files(polaris_jvm_t)
fs_search_cgroup_dirs(polaris_jvm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisjvm.te
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#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris plogd Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplogd.if
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris hm Policy Rules.</summary>

#####

```

```

## <summary>
##   Write into fifo file created by hman, typical case when
##   hman starts script under popen.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_hman_use_fifo`,`
    gen_require(`
        type polaris_hm_t;
    `)

    write_fifo_files_pattern($1, polaris_hm_t, polaris_hm_t)
`)

#####
## <summary>
##   Read tmp files created by hman. I.e /tmp/myhostname.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_hm_tmp_read`,`
    gen_require(`
        type polaris_hm_tmp_t;
    `)

    read_files_pattern($1, polaris_hm_tmp_t, polaris_hm_tmp_t)
`)

#####
## <summary>
##   Execute pkg_summary.sh in its own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>

```

```

#
interface(`polaris_pkg_summary_domtrans`,`
    gen_require(`
        type polaris_pkg_summary_t;
        type polaris_pkg_summary_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_pkg_summary_exec_t, polaris_pkg_summary_t)
)

```

```
#####
```

```

## <summary>
##   Execute pkg_to_tree.sh in its own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#

```

```

interface(`polaris_pkg_to_tree_domtrans`,`
    gen_require(`
        type polaris_pkg_to_tree_t;
        type polaris_pkg_to_tree_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_pkg_to_tree_exec_t, polaris_pkg_to_tree_t)
)

```

```
#####
```

```

## <summary>
## Execute hman in the polaris_cli_fs_cmds domain.
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cli_fs_cmds_domtrans`,`
    gen_require(`
        type polaris_cli_fs_cmds_t, polaris_cli_fs_cmds_exec_t;
    `)
)

```

```
corecmd_search_bin($1)
```

```

domtrans_pattern($1, polaris_cli_fs_cmds_exec_t, polaris_cli_fs_cmds_t)
')

#####
## <summary>
##   Read file /tmp/pkg_summary.txt file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pkg_summary_tmp_read`,`
    gen_require(`
        type polaris_pkg_summary_tmp_t;
    `)
    read_files_pattern($1, polaris_pkg_summary_tmp_t, polaris_pkg_summary_tmp_t)
`)

#####
## <summary>
##   read the contents of /tmp/show_provision_temp
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_show_provision_temp_read`,`
    gen_require(`
        type polaris_show_provision_tmp_t;
    `)
    read_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
`)

#####
## <summary>
##   manage the contents of /tmp/show_provision_temp
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_show_provision_temp_manage`,`

```

```

gen_require(
    type polaris_show_provision_tmp_t;
)
manage_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
manage_lnk_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
manage_dirs_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
files_tmp_filetrans($1, polaris_show_provision_tmp_t, { file dir })
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarishm.if
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```

```

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarispsvp, 1.0);

polaris_process_domain_template(psvp)

# transition to pman domain, once pman is invoked by psvp
polaris_pman_domtrans(polaris_psvp_t)
# transition to pvp domain, once pvp is invoked by psvp
polaris_pvp_domtrans(polaris_psvp_t)

corecmd_exec_bin(polaris_psvp_t)
corecmd_exec_shell(polaris_psvp_t)

# can execute process in polaris domain
polaris_exec(polaris_psvp_t)

# LOOK AT ME start-stop-daemon from busy box iterates all
# /proc/<pid> directories and reads /proc/<pid>/cmdline
# /proc/<pid>/exe. I.e it need quite a bit of priviledges
domain_read_all_domains_state(polaris_psvp_t)

# another issue of running busybox start-stop-daemon under
# psvp_t label
# type=AVC msg=audit(1480527500.482:46): avc: denied { sys_ptrace } for pid=14853 comm="start-stop-daem"
# capability=19 scontext=system_u:system_r:polaris_psvp_t:s0 tcontext=system_u:system_r:polaris_psvp_t:s0
# tclass=capability
allow polaris_psvp_t self:capability sys_ptrace;

```

```

# allow to read /proc/meminfo
kernel_read_system_state(polaris_psvp_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_psvp_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_psvp_t)

# work with /tmp files
type polaris_psvp_tmp_t;
files_tmp_file(polaris_psvp_tmp_t)
manage_dirs_pattern(polaris_psvp_t, tmp_t, polaris_psvp_tmp_t)
manage_files_pattern(polaris_psvp_t, polaris_psvp_tmp_t, polaris_psvp_tmp_t)
manage_fifo_files_pattern(polaris_psvp_t, polaris_psvp_tmp_t, polaris_psvp_tmp_t)
files_tmp_filetrans(polaris_psvp_t, polaris_psvp_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_psvp_tmp_t, dir, "psvp")

#ifdef(^ngwc_family',`
# also need to be able to ls /tmp/ufs/ on ngwc
optional_policy(`
polaris_ncd_tmp_read(polaris_psvp_t)
`)
`)

# note split entry another psvp capability listed above
allow polaris_psvp_t self:capability sys_resource;

polaris_pvp_getattrs_tmp_dirs(polaris_psvp_t)

dmidecode_domtrans(polaris_psvp_t)

polaris_btrace_data_manage(polaris_psvp_t)
polaris_chasfs_manage(polaris_psvp_t)
polaris_cpld_read(polaris_psvp_t)
polaris_cpld_write(polaris_psvp_t)
polaris_rmonbifo_tmp_read(polaris_psvp_t)
polaris_tdldb_list_dirs(polaris_psvp_t)
polaris_boot_tmp_read(polaris_psvp_t)
polaris_disk_crashinfo_getattr(polaris_psvp_t)
polaris_flashlib_read(polaris_psvp_t)
polaris_read_debug_conf(polaris_psvp_t)

allow polaris_psvp_t self:capability dac_override;

# watch /tmp/sai/psvp
allow polaris_psvp_t polaris_psvp_tmp_t:dir watch;

```

```

# creates /tmp/sai/pvp/rp/run_stg2
polaris_pvp_manage_tmp_files(polaris_psvp_t)

# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
ifdef(`vwlc_platform',`
optional_policy(
polaris_ncd_tmp_read(polaris_psvp_t)
')
')

# permissions during shutdown
polaris_pvp_manage_tmp_files(polaris_psvp_t);

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsvp.te
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#
# October 2019, Patrick O'Halloran
#
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#

policy_module(polariscrft, 1.0);

#####
# CRFT policy
#####
gen_require(
    attribute domain;
    attribute polaris_extended_domain;
)

# persistent CRFT files stored under crft_data
type polaris_crft_data_t;
files_type(polaris_crft_data_t)

# allow crft data file reside on persistent storage
polaris_pfile_type(polaris_crft_data_t)

attribute polaris_crft_data_domain;

typeattribute polaris_crft_data_t polaris_crft_data_domain;

# Start of mcp_crft_request context elements
polaris_utility_domain_template(crft_request)

```

```

# smand calls the mcp_crft_request.sh in bexec context
polaris_bexecute_domtrans(polaris_crft_request_t)
polaris_bexecute_domain(polaris_crft_request_t, polaris_crft_request_exec_t)

# read the cpld information
polaris_cpld_read(polaris_crft_request_t)

# dev/pty access as part of bexec operations
telnet_use_ptys(polaris_crft_request_t)

# filesystem attributes for df /
fs_getattr_xattr_fs(polaris_crft_request_t)

# btrace used in script uses these
polaris_btrace_tmppub_manage(polaris_crft_request_t)
polaris_use_btrace_fifo(polaris_crft_request_t)

# read /proc/rmonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_crft_request_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_manage(polaris_crft_request_t)

# ufs information captured by the chasfs utils
ifdef(^ngwc_family',`
optional_policy(`
polaris_ncd_tmp_manage(polaris_crft_request_t)
')
')
# scripts read /proc/cmdline
kernel_read_system_state(polaris_crft_request_t)

# ping the vrf
netutils_domtrans_ping(polaris_crft_request_t)
sysnet_domtrans_ifconfig(polaris_crft_request_t)

# rsync operations for members and standby rps
gen_require(`
    type rsync_exec_t;
    type rsync_port_t;
')
allow polaris_crft_request_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
allow polaris_crft_request_t rsync_port_t:tcp_socket name_connect;

# access to /etc/hosts for rp/members information
gen_require(`
    type net_conf_t;
')

```

```

files_etc_filetrans(polaris_crft_request_t, net_conf_t, file, "hosts")
auth_use_nsswitch(polaris_crft_request_t)

# execute the bash script
corecmd_exec_bin(polaris_crft_request_t)

# net namespace filesystem
fs_read_nsfs_files(polaris_crft_request_t)
polaris_chasfs_manage(polaris_crft_request_t)

# script also accesses the persistent files from crft
polaris_persistent_manage(polaris_crft_request_t)
polaris_crft_data_manage_all(polaris_crft_request_t)

# ping operations via ip netns
gen_require(
    type ifconfig_t;
)
netutils_domtrans_ping(ifconfig_t)

# Curl accesses from IoT boxes like petra/sparrow
gen_require(
    type polaris_curl_t;
    type polaris_iosd_t;
)
allow polaris_curl_t polaris_crft_request_t:process sigchld;

# handle mktemp creation and cleanup
files_manage_generic_tmp_dirs(polaris_crft_request_t)
allow polaris_crft_request_t self:capability sys_resource;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscrft.te
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#
# July 2017, Victor Kamensky
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#

policy_module(polaristamdrp, 1.0);

gen_require(
    type polaris_tamd_rp_t;
)

```

```

polaris_btrace_data_manage(polaris_tamd_rp_t)
polaris_crft_data_manage(polaris_tamd_rp_t)
polaris_chasfs_manage(polaris_tamd_rp_t)
polaris_tdlresolve_read(polaris_tamd_rp_t)
polaris_tdlldb_list_dirs(polaris_tamd_rp_t)
polaris_flashlib_read(polaris_tamd_rp_t)
logging_send_syslog_msg(polaris_tamd_rp_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_tamd_rp_t)

polaris_cpld_read(polaris_tamd_rp_t)
polaris_cpld_write(polaris_tamd_rp_t)

polaris_quack_dev_use(polaris_tamd_rp_t)

# tmp file for udi authentication
type polaris_tamd_rp_tmp_t;
files_tmp_file(polaris_tamd_rp_tmp_t);
files_tmp_filetrans(polaris_tamd_rp_t, polaris_tamd_rp_tmp_t, file, "tam_uid_validation")
manage_files_pattern(polaris_tamd_rp_t, polaris_tamd_rp_tmp_t, polaris_tamd_rp_tmp_t)
polaris_cm_rp_tmp_manage(polaris_tamd_rp_t)

# hybrid tam needs access to /objstore/.swtam
gen_require(`
    type polaris_disk_objstore_t;
    type root_t;
`)
filetrans_pattern(polaris_tamd_rp_t, root_t, polaris_disk_objstore_t, dir, "objstore")
manage_dirs_pattern(polaris_tamd_rp_t, polaris_disk_objstore_t, polaris_disk_objstore_t)
polaris_disk_objstore_manage(polaris_tamd_rp_t)

# need access to dash fpga to read/write TAM
optional_policy(`
    polaris_dash_dev_use(polaris_tamd_rp_t)
`)

#access to /dev/dash_fpga device on fugazi platform
ifdef(^fugazi_platform`,`
    polaris_dash_dev_mcp_use(polaris_tamd_rp_t)
`)

allow polaris_tamd_rp_t self:capability net_admin;

# LOOK AT ME tamd_rp needs shell access to do something like this
# sh -c "echo 0x04 > /sys/devices/platform/cpld/reg_rp_reset_control"
# need to rework into simple open,write,close
corecmd_exec_shell(polaris_tamd_rp_t)

```

```
# LOOK AT ME access should be restricted after /flash/dummy_check is removed,  
# which is tracked under CSCvh68866. Allow access to bootflash till then.  
polaris_bootflash_read(polaris_tamd_rp_t)
```

```
optional_policy(`  
# Allow /dev/dmabmap access  
polaris_dmabmap_dev_use(polaris_tamd_rp_t)  
)
```

```
# LOOK AT ME: /dev/mem access restriction  
polaris_dev_mem_use(polaris_tamd_rp_t)
```

```
optional_policy(`  
polaris_ngwc_shm_manage(polaris_tamd_rp_t)  
)
```

```
optional_policy(`  
polaris_remap_mem_dev_use(polaris_tamd_rp_t)  
)
```

```
polaris_cpuld_dev_use(polaris_tamd_rp_t)
```

```
optional_policy(`  
# allow access to /sys/devices/virtual/misc/ggpiio/gpio_out_assert  
polaris_ggpiio_dev_read_write(polaris_tamd_rp_t)  
)
```

```
optional_policy(`  
    polaris_quake_i2c_manage(polaris_tamd_rp_t)  
)
```

```
# /dev/aikido access  
polaris_aikido_dev_use(polaris_tamd_rp_t)
```

```
# tamlib debug file access  
polaris_tamlib_dbg_file_manage(polaris_tamd_rp_t)
```

```
# tam gpio sysfs access  
optional_policy(`  
dev_rw_sysfs(polaris_tamd_rp_t)  
)
```

```
ifdef(^petra_platform',`  
#allow access to /dev/i2c-0 for hash value  
polaris_i2c_use(polaris_tamd_rp_t)  
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamdrp.te

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#

# March 2017, Victor Kamensky

#

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#

/usr/binos/conf/sort\_files\_by\_inode.sh -- gen\_context(system\_u:object\_r:polaris\_sort\_files\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissortfiles.fc

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#

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#

policy\_module(polariscedgestart, 1.0);

gen\_require(^

    type polaris\_cedge\_start\_t;

')

polaris\_chasfs\_manage(polaris\_cedge\_start\_t)

polaris\_boot\_tmp\_read(polaris\_cedge\_start\_t)

polaris\_bootflash\_manage(polaris\_cedge\_start\_t)

polaris\_cpld\_read(polaris\_cedge\_start\_t)

polaris\_flashlib\_read(polaris\_cedge\_start\_t)

polaris\_rmonbifo\_tmp\_read(polaris\_cedge\_start\_t)

polaris\_btrace\_tmppub\_read(polaris\_cedge\_start\_t)

# needed by install\_util.sh

polaris\_read\_packages\_conf(polaris\_cedge\_start\_t)

corecmd\_exec\_bin(polaris\_cedge\_start\_t)

corecmd\_exec\_shell(polaris\_cedge\_start\_t)

auth\_use\_nsswitch(polaris\_cedge\_start\_t)

polaris\_dmi\_ports\_fetch\_domtrans(polaris\_cedge\_start\_t)

# runs ps -C cfgmgr -o pid=

```

# ps needs access to proc_t
kernel_read_system_state(polaris_cedge_start_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_cedge_start_t)
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_cedge_start_t)

# runs vip-confd-startup.sh needs transition into polaris_confid_t domain
polaris_confid_domtrans(polaris_cedge_start_t)

# runs systemctl start logrotate.service
systemd_exec_systemctl(polaris_cedge_start_t)

# manage /etc/viptela
polaris_cedge_etc_manage(polaris_cedge_start_t)

# runs install_assist.sh
polaris_install_engine_domtrans(polaris_cedge_start_t)

# write /bootflash/.installer/images/pkg_boot_17.3.01/version
polaris_disk_install_manage(polaris_cedge_start_t)
gen_require(
    type polaris_disk_install_t;
)
# du -s /bootflash/.installer/images/pkg_boot_17.3.01/confd0/cdb
allow polaris_cedge_start_t polaris_disk_install_t:filesystem getattr;

# chown -R binos /bootflash/sdwan
fs_getattr_xattr_fs(polaris_cedge_start_t)

allow polaris_cedge_start_t self:capability { chown fowner net_admin };

# PLEASE LOOK AT ME cedge_start.sh modifies set of directories that
# are supposed to be read only, like usr_t, etc_t, root_t
files_rw_usr_dirs(polaris_cedge_start_t)
gen_require(
    type usr_t;
)
manage_lnk_files_pattern(polaris_cedge_start_t, usr_t, usr_t)
libs_manage_lib_dirs(polaris_cedge_start_t)
gen_require(
    type lib_t;
)
manage_lnk_files_pattern(polaris_cedge_start_t, lib_t, lib_t)
files_manage_etc_symlinks(polaris_cedge_start_t)
files_manage_var_symlinks(polaris_cedge_start_t)
# creates /home directory in root

```

```

gen_require(
    type root_t;
)
manage_dirs_pattern(polaris_cedge_start_t, root_t, root_t)
manage_lnk_files_pattern(polaris_cedge_start_t, root_t, root_t)
# creates /var/log/sdwan
gen_require(
    type var_log_t;
)
manage_dirs_pattern(polaris_cedge_start_t, var_log_t, var_log_t)
manage_lnk_files_pattern(polaris_cedge_start_t, var_log_t, var_log_t)
corecmd_manage_bin_files(polaris_cedge_start_t)

# PLEASE LOOK AT ME copy unit files into /lib/systemd/system
# cp /tmp/sw/rp/0/0/rp_daemons/mount/lib/systemd/system/logrotate.service /lib/systemd/system
gen_require(
    type systemd_unit_file_t;
)
read_lnk_files_pattern(polaris_cedge_start_t, systemd_unit_file_t, systemd_unit_file_t)

# PLEASE LOOK AT ME need to have separate label for logrotate.service
# allow only to start if, do it once copy of logrotate.service is fixed
systemd_config_generic_services(polaris_cedge_start_t)
init_start(polaris_cedge_start_t)

# creates /var/log/confd
polaris_confnd_var_log_manage(polaris_cedge_start_t)

# executes touch /etc/resolv.conf for case when it is missing
# check create_etc_resolv_conf make sure that it becomes net_conf_t
gen_require(
    type net_conf_t;
)
files_etc_filetrans(polaris_cedge_start_t, net_conf_t, file, "resolv.conf")
sysnet_create_config(polaris_cedge_start_t)
sysnet_write_config(polaris_cedge_start_t)

# creates /var/confd0 when box boots with startup config disabled
polaris_confnd_var_filetrans(polaris_cedge_start_t, dir, "confd0")

polaris_confnd_var_dir_manage(polaris_cedge_start_t)

#####
# During controller-mode enablement/bringup,
# viptela scripts are not loaded as part of the base packages.
# viptela-start.sh script takes care of creating these references.
# It creates softlink copies them as below to desired location depending on the packaging (mono vs subpackage).
# "cp $PKG_PATH/lib/systemd/system/logrotate.service /lib/systemd/system"

```

```

# Below policy statement allow copy access needed for viptela-logrotate.sh
# for updating /lib/systemd/system and /usr/binos/conf path
write_files_pattern(polaris_cedge_start_t, systemd_unit_file_t, systemd_unit_file_t)

# While creating softlink as below
# "ln -sf $PKG_PATH/usr/binos/conf/viptela-logrotate.sh /usr/binos/conf/viptela-logrotate.sh"
# As the ln command tries to create the new link, it removes the already existing link.
# ln deletes the file associated with the path name if this path name is the last link to the file.
# If ln can't get rid of the conflicting path name, it does not attempt to establish the new link.
# If ln successfully removes the conflicting path name, it then establishes the link.
# delete file permissions are hence needed for ln command to perform unlinking previous link
files_delete_etc_files(polaris_cedge_start_t)
#####

# During cEdge upgrade, viptela-start.sh needs permissions to maintain the
# state of roll back timer in /bootflash/.rollback_timer/*
polaris_rbtimer_bootflash_manage(polaris_cedge_start_t)

#Nutella-XE - Vedge image install
#/bin/bash /tmp/sw/rp/0/0/rp_security/mount/usr/binos/conf/viptela-start.sh
mount_domtrans(polaris_cedge_start_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedgestart.te

```

# 1.90 python-engineio 3.14.2

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# 1.91 checkpolicy 2.9 1.el8

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## 1.95 colorama 0.4.4

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## 1.96 python-requests 2.26.0

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## 1.97 python-certifi 2021.10.08

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THE BASIC LIBRARY FUNCTIONS

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## 1.104 dracut 049-202.git20220511.el8\_6

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## 1.105 kerberos 1.18.2-14.el8

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cmd/krb5/slave/kpropd\_rpc.c  
lib/gss\_mechs/mech\_krb5/et/kdb5\_err.c  
lib/gss\_mechs/mech\_spnego/mech\_gssapiP\_spnego.h  
lib/gss\_mechs/mech\_spnego/mech\_spnego\_mech.c  
lib/krb5/kadm5/kadm\_host\_srv\_names.c  
lib/krb5/kdb/kdb\_convert.c  
lib/krb5/kdb/kdb\_hdr.h  
lib/krb5/kdb/kdb\_log.c  
lib/krb5/kdb/kdb\_log.h  
lib/libgss/g\_accept\_sec\_context.c  
lib/libgss/g\_acquire\_cred.c  
lib/libgss/g\_canon\_name.c  
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lib/libgss/g\_dsp\_name.c  
lib/libgss/g\_dsp\_status.c  
lib/libgss/g\_dup\_name.c  
lib/libgss/g\_exp\_sec\_context.c  
lib/libgss/g\_export\_name.c  
lib/libgss/g\_glue.c  
lib/libgss/g\_imp\_name.c  
lib/libgss/g\_imp\_sec\_context.c  
lib/libgss/g\_init\_sec\_context.c  
lib/libgss/g\_initialize.c  
lib/libgss/g\_inquire\_context.c  
lib/libgss/g\_inquire\_cred.c  
lib/libgss/g\_inquire\_names.c  
lib/libgss/g\_process\_context.c  
lib/libgss/g\_rel\_buffer.c  
lib/libgss/g\_rel\_cred.c  
lib/libgss/g\_rel\_name.c  
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lib/libgss/g\_seal.c  
lib/libgss/g\_sign.c  
lib/libgss/g\_store\_cred.c  
lib/libgss/g\_unseal.c  
lib/libgss/g\_userok.c  
lib/libgss/g\_utils.c  
lib/libgss/g\_verify.c  
lib/libgss/gssd\_pname\_to\_uid.c  
uts/common/gssapi/include/gssapi\_err\_generic.h  
uts/common/gssapi/include/mechglueP.h

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lib/gssapi/mechglue/g\_acquire\_cred.c  
lib/gssapi/mechglue/g\_canon\_name.c  
lib/gssapi/mechglue/g\_compare\_name.c  
lib/gssapi/mechglue/g\_context\_time.c  
lib/gssapi/mechglue/g\_delete\_sec\_context.c  
lib/gssapi/mechglue/g\_dsp\_name.c  
lib/gssapi/mechglue/g\_dsp\_status.c  
lib/gssapi/mechglue/g\_dup\_name.c  
lib/gssapi/mechglue/g\_exp\_sec\_context.c  
lib/gssapi/mechglue/g\_export\_name.c  
lib/gssapi/mechglue/g\_glue.c  
lib/gssapi/mechglue/g\_imp\_name.c  
lib/gssapi/mechglue/g\_imp\_sec\_context.c  
lib/gssapi/mechglue/g\_init\_sec\_context.c  
lib/gssapi/mechglue/g\_initialize.c  
lib/gssapi/mechglue/g\_inquire\_context.c  
lib/gssapi/mechglue/g\_inquire\_cred.c  
lib/gssapi/mechglue/g\_inquire\_names.c  
lib/gssapi/mechglue/g\_process\_context.c  
lib/gssapi/mechglue/g\_rel\_buffer.c  
lib/gssapi/mechglue/g\_rel\_cred.c  
lib/gssapi/mechglue/g\_rel\_name.c  
lib/gssapi/mechglue/g\_rel\_oid\_set.c  
lib/gssapi/mechglue/g\_seal.c  
lib/gssapi/mechglue/g\_sign.c  
lib/gssapi/mechglue/g\_store\_cred.c  
lib/gssapi/mechglue/g\_unseal.c  
lib/gssapi/mechglue/g\_userok.c  
lib/gssapi/mechglue/g\_utils.c  
lib/gssapi/mechglue/g\_verify.c  
lib/gssapi/mechglue/gssd\_pname\_to\_uid.c  
lib/gssapi/mechglue/mglueP.h  
lib/gssapi/mechglue/oid\_ops.c  
lib/gssapi/spnego/gssapiP\_spnego.h  
lib/gssapi/spnego/spnego\_mech.c

and the initial implementation of incremental propagation, including  
the following new or changed files:

include/iprop\_hdr.h

kadmin/server/ipropd\_svc.c  
lib/kdb/iprop.x  
lib/kdb/kdb\_convert.c  
lib/kdb/kdb\_log.c  
lib/kdb/kdb\_log.h  
lib/krb5/error\_tables/kdb5\_err.et  
kprop/kpropd\_rpc.c  
kprop/kproplog.c

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## 1.109 libsepol 2.9-3.el8

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## 1.111 python-pip 22.2.2

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This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities  
(CA). These were automatically extracted from Mozilla's root certificates  
file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore  
can be directly used with curl / libcurl / php\_curl, or with  
an Apache+mod\_ssl webserver for SSL client authentication.  
Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$  
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#### A. HISTORY OF THE SOFTWARE

=====

Python was created in the early 1990s by Guido van Rossum at Stichting  
Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands  
as a successor of a language called ABC. Guido remains Python's  
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for  
National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>)

in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
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| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
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| 2.4.1          | 2.4          | 2005      | PSF        | yes                 |
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| 2.4.3          | 2.4.2        | 2006      | PSF        | yes                 |
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| 2.5            | 2.4          | 2006      | PSF        | yes                 |
| 2.5.1          | 2.5          | 2007      | PSF        | yes                 |
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|       |       |      |     |     |
|-------|-------|------|-----|-----|
| 2.5.3 | 2.5.2 | 2008 | PSF | yes |
| 2.6   | 2.5   | 2008 | PSF | yes |
| 2.6.1 | 2.6   | 2008 | PSF | yes |
| 2.6.2 | 2.6.1 | 2009 | PSF | yes |
| 2.6.3 | 2.6.2 | 2009 | PSF | yes |
| 2.6.4 | 2.6.3 | 2009 | PSF | yes |
| 2.6.5 | 2.6.4 | 2010 | PSF | yes |
| 3.0   | 2.6   | 2008 | PSF | yes |
| 3.0.1 | 3.0   | 2009 | PSF | yes |
| 3.1   | 3.0.1 | 2009 | PSF | yes |
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

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| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |

|               |           |          |     |     |
|---------------|-----------|----------|-----|-----|
| 2.0.1         | 2.0+1.6.1 | 2001     | PSF | yes |
| 2.1.1         | 2.1+2.0.1 | 2001     | PSF | yes |
| 2.1.2         | 2.1.1     | 2002     | PSF | yes |
| 2.1.3         | 2.1.2     | 2002     | PSF | yes |
| 2.2 and above | 2.1.1     | 2001-now | PSF | yes |

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However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a

fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of

a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be

linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

c) If distribution of the work is made by offering access to copy

from a designated place, offer equivalent access to copy the above specified materials from the same place.

d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

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<one line to give the library's name and a brief idea of what it does.>  
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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

# 1.117 less 530 1.e18

## 1.117.1 Available under license :

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Version 3, 29 June 2007

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Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

## TERMS AND CONDITIONS

### 0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

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To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

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#### 1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but

which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

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#### 6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

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- b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.
- c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.
- d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the

Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

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43mI,5WEV @@ WEV @mImImIAmImImI0mImImI*mImI
A0mImImI...
lost+found...
```

```
;9GimCN7g
```

```
!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

```
!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

```
!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

```
!"#$%&'()*+,-
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~WEV @@
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Included for the use of the fix\_strcasecmp.c module which works around a Solaris problem.

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# 1.125 kerberos 1.18

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cmd/krb5/iproplib/iproplib_hdr.h
cmd/krb5/kadmin/server/iproplib_svc.c
cmd/krb5/kproplog/kproplog.c
cmd/krb5/slave/kpropd_rpc.c
lib/gss_mechs/mech_krb5/et/kdb5_err.c
lib/gss_mechs/mech_spnego/mech_gssapiP_spnego.h
lib/gss_mechs/mech_spnego/mech_spnego_mech.c
lib/krb5/kadm5/kadm_host_srv_names.c
lib/krb5/kdb/kdb_convert.c
lib/krb5/kdb/kdb_hdr.h
lib/krb5/kdb/kdb_log.c
lib/krb5/kdb/kdb_log.h
lib/libgss/g_accept_sec_context.c
lib/libgss/g_acquire_cred.c
lib/libgss/g_canon_name.c
lib/libgss/g_compare_name.c
lib/libgss/g_context_time.c
lib/libgss/g_delete_sec_context.c
lib/libgss/g_dsp_name.c
lib/libgss/g_dsp_status.c
lib/libgss/g_dup_name.c
lib/libgss/g_exp_sec_context.c
lib/libgss/g_export_name.c
```

lib/libgss/g\_glue.c  
lib/libgss/g\_imp\_name.c  
lib/libgss/g\_imp\_sec\_context.c  
lib/libgss/g\_init\_sec\_context.c  
lib/libgss/g\_initialize.c  
lib/libgss/g\_inquire\_context.c  
lib/libgss/g\_inquire\_cred.c  
lib/libgss/g\_inquire\_names.c  
lib/libgss/g\_process\_context.c  
lib/libgss/g\_rel\_buffer.c  
lib/libgss/g\_rel\_cred.c  
lib/libgss/g\_rel\_name.c  
lib/libgss/g\_rel\_oid\_set.c  
lib/libgss/g\_seal.c  
lib/libgss/g\_sign.c  
lib/libgss/g\_store\_cred.c  
lib/libgss/g\_unseal.c  
lib/libgss/g\_userok.c  
lib/libgss/g\_utils.c  
lib/libgss/g\_verify.c  
lib/libgss/gssd\_pname\_to\_uid.c  
uts/common/gssapi/include/gssapi\_err\_generic.h  
uts/common/gssapi/include/mechglueP.h

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lib/gssapi/generic/gssapi\_err\_generic.et  
lib/gssapi/mechglue/g\_accept\_sec\_context.c  
lib/gssapi/mechglue/g\_acquire\_cred.c  
lib/gssapi/mechglue/g\_canon\_name.c  
lib/gssapi/mechglue/g\_compare\_name.c  
lib/gssapi/mechglue/g\_context\_time.c  
lib/gssapi/mechglue/g\_delete\_sec\_context.c  
lib/gssapi/mechglue/g\_dsp\_name.c  
lib/gssapi/mechglue/g\_dsp\_status.c  
lib/gssapi/mechglue/g\_dup\_name.c  
lib/gssapi/mechglue/g\_exp\_sec\_context.c  
lib/gssapi/mechglue/g\_export\_name.c  
lib/gssapi/mechglue/g\_glue.c  
lib/gssapi/mechglue/g\_imp\_name.c  
lib/gssapi/mechglue/g\_imp\_sec\_context.c  
lib/gssapi/mechglue/g\_init\_sec\_context.c  
lib/gssapi/mechglue/g\_initialize.c  
lib/gssapi/mechglue/g\_inquire\_context.c  
lib/gssapi/mechglue/g\_inquire\_cred.c  
lib/gssapi/mechglue/g\_inquire\_names.c  
lib/gssapi/mechglue/g\_process\_context.c  
lib/gssapi/mechglue/g\_rel\_buffer.c  
lib/gssapi/mechglue/g\_rel\_cred.c  
lib/gssapi/mechglue/g\_rel\_name.c

lib/gssapi/mechglue/g\_rel\_oid\_set.c  
lib/gssapi/mechglue/g\_seal.c  
lib/gssapi/mechglue/g\_sign.c  
lib/gssapi/mechglue/g\_store\_cred.c  
lib/gssapi/mechglue/g\_unseal.c  
lib/gssapi/mechglue/g\_userok.c  
lib/gssapi/mechglue/g\_utils.c  
lib/gssapi/mechglue/g\_verify.c  
lib/gssapi/mechglue/gssd\_pname\_to\_uid.c  
lib/gssapi/mechglue/mglueP.h  
lib/gssapi/mechglue/oid\_ops.c  
lib/gssapi/spnego/gssapiP\_spnego.h  
lib/gssapi/spnego/spnego\_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/ipropr\_hdr.h  
kadmin/server/ipropr\_svc.c  
lib/kdb/ipropr.x  
lib/kdb/kdb\_convert.c  
lib/kdb/kdb\_log.c  
lib/kdb/kdb\_log.h  
lib/krb5/error\_tables/kdb5\_err.et  
kprop/kpropd\_rpc.c  
kprop/kproplog.c

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@c ispell-local-pdict: "ispell-dict"

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```
#  
# This is a Makefile stub which handles the creation of BSD shared  
# libraries.  
#  
# In order to use this stub, the following makefile variables must be defined.  
#  
# BSDLIB_VERSION = 1.0  
# BSDLIB_IMAGE = libce  
# BSDLIB_MYDIR = et  
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)  
#
```

```
all:: image
```

```
real-subdirs:: Makefile  
@echo " MKDIR pic"  
@mkdir -p pic
```

```
BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)  
BSDLIB_PIC_FLAG = -fpic
```

```
image: $(BSD_LIB)
```

```
$(BSD_LIB): $(OBJS)  
(cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))  
$(MV) pic/$(BSD_LIB) .  
$(RM) -f ../$(BSD_LIB)  
(cd ..; $(LN) $(LINK_BUILD_FLAGS) \  
`echo $(my_dir) | sed -e 's;lib/;;'/'$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install:: $(BSD_LIB)
@echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
@$(INSTALL_PROGRAM) $(BSD_LIB) \
$(DESTDIR)$ (BSDLIB_INSTALL_DIR)/$(BSD_LIB)
@-$(LDCONFIG)
```

install-strip: install

install-shlibs-strip:: install-shlibs

```
uninstall-shlibs uninstall::
$(RM) -f $(DESTDIR)$ (BSDLIB_INSTALL_DIR)/$(BSD_LIB)
```

```
clean::
$(RM) -rf pic
$(RM) -f $(BSD_LIB)
$(RM) -f ../$(BSD_LIB)
```

This package was added to the e2fsprogs debian source package by Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

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Index: tdbsa/tdb.c

=====

--- tdbsa.orig/tdb.c

+++ tdbsa/tdb.c

@@ -4,11 +4,11 @@ Rev: 23371

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\*/

/\*

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- trivial database library - private includes

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It is part of the main e2fsprogs distribution, which can be found at:

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## 1.133 configparser 3.5.0

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Aamir Khan <syst3m.w0rm@gmail.com>  
Aaron Beitch <aaronb@arista.com>  
Aaron Bieber <deftly@gmail.com>  
Aaron Cannon <cannona@fireantproductions.com>  
Aaron France <aaron.l.france@gmail.com>  
Aaron Jacobs <jacobsa@google.com>  
Aaron Jensen <jensen.aaro@gmail.com>  
Aaron Kemp <kemp.aaron@gmail.com>  
Aaron Patterson <tenderlove@ruby-lang.org>  
Aaron Sheah <aaronsheah@gmail.com>  
Aaron Stein <aaronstein12@gmail.com>  
Aaron Torres <tcboox@gmail.com>  
Aaron Zinman <aaron@azinman.com>  
Aarti Parikh <aarti.parikh@gmail.com>  
Abdullah Al Maruf <mymail.maruf@gmail.com>  
Abe Haskins <abeisgreat@abeisgreat.com>  
Abhinav Gupta <abhinav.g90@gmail.com>

Adam Azarchs <adam.azarchs@10xgenomics.com>  
Adam Bender <abender@google.com>  
Adam Eijdenberg <adam@continusec.com>  
Adam Harvey <aharvey@php.net>  
Adam Kisala <adam.kisala@gmail.com>  
Adam Langley <agl@golang.org>  
Adam Medzinski <adam.medzinski@gmail.com>  
Adam Mitha <adam.mitha@gmail.com>  
Adam Shannon <adamkshannon@gmail.com>  
Adam Shelton <aashelt90@gmail.com>  
Adam Sindelar <adamsh@google.com>  
Adam Thomason <athomason@gmail.com>  
Adam Williams <pwnfactory@gmail.com>  
Adam Woodbeck <adam@woodbeck.net>  
Adarsh Ravichandran <adarshravichandran91@gmail.com>  
Adel Rodriguez <adel.rodriguez@leftfieldlabs.com>  
Adin Scannell <ascannell@google.com>  
Aditya Harindar <aditya.harindar@gmail.com>  
Aditya Mukerjee <dev@chimeracoder.net>  
Adrian Hesketh <adrianhesketh@hushmail.com>  
Adrian Nos <nos.adrian@gmail.com>  
Adrian O'Grady <elpollouk@gmail.com>  
Adrien Bustany <adrien-xx-google@bustany.org>  
Adrien Delorme <adrien.delorme@icloud.com>  
Adrien Petel <peteladrien@gmail.com>  
Acio Jnior <aeciodantasjunior@gmail.com>  
Aeneas Rekkas (arekkas) <aeneas@ory.am>  
Afanasev Stanislav <phpprogger@gmail.com>  
Agis Anastasopoulos <agis.anast@gmail.com>  
Agniva De Sarker <agnivade@yahoo.co.in>  
Ahmed W. Mones <oneofone@gmail.com>  
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Ahmet Alp Balkan <ahmetb@google.com>  
Ahmet Soormally <ahmet@mangomm.co.uk>  
Ahmy Yulrizka <yulrizka@gmail.com>  
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Aidan Coyle <packrat386@gmail.com>  
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Aishraj Dahal <aishraj@users.noreply.github.com>  
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Al Cutter <al@google.com>  
Alan Braithwaite <alan@ipaddr.org>  
Alan Donovan <adonovan@google.com>  
Alan Shreve <alan@inconshreveable.com>

Albert Nigmatzianov <albertnigma@gmail.com>  
Albert Strasheim <fullung@gmail.com>  
Albert Teoh <albert.teoh@gmail.com>  
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Alberto Bertogli <albertito@blitiri.com.ar>  
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Alexander Greim <alexxx@iltempo.de>  
Alexander Guz <kalimatas@gmail.com>  
Alexander Kauer <alexander@affine.space>  
Alexander Klauer <Alexander.Klauer@googlemail.com>  
Alexander Kucherenko <alxkchr@gmail.com>  
Alexander Larsson <alexander.larsson@gmail.com>  
Alexander Lourier <aml@rulezz.ru>  
Alexander Menzhinsky <amenzhinsky@gmail.com>  
Alexander Morozov <lk4d4math@gmail.com>

Alexander Neumann <alexander@bumpern.de>  
Alexander Nohe <alex.nohe427@gmail.com>  
Alexander Orlov <alexander.orlov@loxal.net>  
Alexander Pantyukhin <apantykhin@gmail.com>  
Alexander Polcyn <apolcyn@google.com>  
Alexander Rakoczy <alex@golang.org>  
Alexander Reece <awreece@gmail.com>  
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Alexey Borzenkov <snaury@gmail.com>  
Alexey Naidonov <alexey.naidyonov@gmail.com>  
Alexey Neganov <neganovalexey@gmail.com>  
Alexey Palazhchenko <alexey.palazhchenko@gmail.com>  
Alexey Semenyuk <alexsemenyuk88@gmail.com>  
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Ali Farooq <ali.farooq0@pm.me>  
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Allan Guwatudde <guwats10@gmail.com>  
Allan Simon <allan.simon@supinfo.com>  
Allen Li <ayatane@google.com>  
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Alwin Doss <alwindoss84@gmail.com>  
Aman Gupta <aman@tmm1.net>  
Amarjeet Anand <amarjeetanandsingh@gmail.com>  
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Amrut Joshi <amrut.joshi@gmail.com>  
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An Xiao <hac@zju.edu.cn>

Anand K. Mistry <anand@mistry.ninja>  
Ananya Saxena <ananyasaxena1@gmail.com>  
Anatol Pomozov <anatol.pomozov@gmail.com>  
Anders Pearson <anders@columbia.edu>  
Anderson Queiroz <contato@andersonq.eti.br>  
Andr Carvalho <asantostc@gmail.com>  
Andr Martins <aanm90@gmail.com>  
Andre Nathan <andrenth@gmail.com>  
Andrea Nodari <andrea.nodari91@gmail.com>  
Andrea Simonini <andrea.simonini@gmail.com>  
Andrea Spadaccini <spadaccio@google.com>  
Andreas Auernhammer <aead@mail.de>  
Andreas Jellinghaus <andreas@ionisiert.de> <anj@google.com>  
Andreas Litt <andreas.litt@gmail.com>  
Andrei Enshin <b1os@bk.ru>  
Andrei Gherzan <andrei@resin.io>  
Andrei Korzhevskii <a.korzhevskiy@gmail.com>  
Andrei Matei <andrei@cockroachlabs.com>  
Andrei Tudor Clin <mail@acln.ro>  
Andrei Vagin <avagin@google.com>  
Andrei Vieru <euvieru@gmail.com>  
Andres Erbsen <andreser@google.com>  
Andres Lowrie <andres.lowrie@gmail.com>  
Andrew Austin <andrewacht@gmail.com>  
Andrew Balholm <andybalholm@gmail.com>  
Andrew Benton <andrewmbenton@gmail.com>  
Andrew Bonventre <andybons@chromium.org>  
Andrew Braunstein <awbraunstein@gmail.com>  
Andrew Bursavich <abursavich@gmail.com>  
Andrew Ekstedt <andrew.ekstedt@gmail.com>  
Andrew Etter <andrew.etter@gmail.com>  
Andrew G. Morgan <agm@google.com>  
Andrew Gerrand <adg@golang.org>  
Andrew Harding <andrew@spacemonkey.com>  
Andrew Jackura <ajackura@google.com>  
Andrew Kemm <andrewkemm@gmail.com>  
Andrew Louis <alouis@digitalocean.com>  
Andrew Lutomirski <andy@luto.us>  
Andrew Medvedev <andrew.y.medvedev@gmail.com>  
Andrew Pilloud <andrewpilloud@igneoussystems.com>  
Andrew Pogrebnoy <absourd.noise@gmail.com>  
Andrew Poydence <apoydence@pivotal.io>  
Andrew Pritchard <awpritchard@gmail.com>  
Andrew Radev <andrey.radev@gmail.com>  
Andrew Skiba <skibaa@gmail.com>  
Andrew Stormont <astormont@racktopsystems.com>  
Andrew Striblehill <ads@wompom.org>  
Andrew Szeto <andrew@jabagawee.com>

Andrew Todd <andrew.todd@wework.com>  
Andrew Werner <andrew@upthere.com> <awerner32@gmail.com>  
Andrew Wilkins <axwalk@gmail.com>  
Andrew Williams <williams.andrew@gmail.com>  
Andrew Z Allen <me@andrewzallen.com>  
Andrey Bokhanko <andreybokhanko@gmail.com>  
Andrey Mirtchovski <mirtchovski@gmail.com>  
Andrey Petrov <andrey.petrov@shazow.net>  
Andrii Soldatenko <andrii.soldatenko@gmail.com>  
Andrii Soluk <isoluchok@gmail.com>  
Andriy Lytvynov <lytvynov.a.v@gmail.com>  
Andrzej eel <andrii.zhezhel@gmail.com>  
Andy Balholm <andy@balholm.com>  
Andy Davis <andy@bigandian.com>  
Andy Finkenstadt <afinkenstadt@zynga.com>  
Andy Lindeman <andy@lindeman.io>  
Andy Maloney <asmaloney@gmail.com>  
Andy Pan <panjf2000@gmail.com> <panjf2000@golangcn.org> <i@andypan.me>  
Andy Walker <walkeraj@gmail.com>  
Andy Wang <cbeuw.andy@gmail.com>  
Andy Williams <andy@andy.xyz>  
Andy Zhao <andyzhao@google.com>  
Andzej Maciusovic <andzej.maciusovic@gmail.com>  
Anfernee Yongkun Gui <anfernee.gui@gmail.com>  
Angelo Bulfone <mbulfone@gmail.com>  
Anh Hai Trinh <anh.hai.trinh@gmail.com>  
Anit Gandhi <anitgandhi@gmail.com>  
Ankit Goyal <ankit3goyal@gmail.com>  
Anmol Sethi <anmol@aubble.com>  
Annirudh Prasad <annirudh@wandb.com>  
Anschel Schaffer-Cohen <anschelsc@gmail.com>  
Anthony Alves <cvballa3g0@gmail.com>  
Anthony Canino <anthony.canino1@gmail.com>  
Anthony Eufemio <anthony.eufemio@gmail.com>  
Anthony Fok <foka@debian.org>  
Anthony Martin <ality@pbrane.org>  
Anthony Sottile <asottile@umich.edu>  
Anthony Starks <ajstarks@gmail.com>  
Anthony Voutas <voutasaurus@gmail.com>  
Anthony Woods <awoods@raintank.io>  
Antoine GIRARD <sapk@sapk.fr>  
Antoine Martin <antoine97.martin@gmail.com>  
Anton Gyllenberg <anton@iki.fi>  
Anton Kuklin <anton.a.kuklin@gmail.com>  
Antonin Amand <antonin.amand@gmail.com>  
Antonio Antelo <aantelov87@gmail.com>  
Antonio Bibiano <antbbn@gmail.com>  
Antonio Garcia <garcia.olais@gmail.com>

Antonio Huete Jimenez <tuxillo@quantumachine.net>  
Antonio Murdaca <runcom@redhat.com>  
Antonio Troina <thoeni@gmail.com>  
Anze Kolar <me@akolar.com>  
Aofei Sheng <aofei@aofeisheng.com>  
Apisak Darakananda <pongad@gmail.com>  
Aram Hvrneanu <aram@mgk.ro>  
Araragi Hokuto <kanseihonbucho@protonmail.com>  
Arash Bina <arash@arash.io>  
Arda Gl <ardaguclu@gmail.com>  
Areski Belaid <areski@gmail.com>  
Ariel Mashraki <ariel@mashraki.co.il>  
Arkadi Pyuro <arkadi@google.com>  
Arlo Breault <arlolra@gmail.com>  
Arnaud Ysmal <arnaud.ysmal@gmail.com>  
Arne Hormann <arnehormann@gmail.com>  
Arnout Engelen <arnout@bzzt.net>  
Aron Nopanen <aron.nopanen@gmail.com>  
Artem Alekseev <artem.alekseev@intel.com>  
Artem Khvastunov <artem.khvastunov@jetbrains.com>  
Artem Kolin <artemkaxboy@gmail.com>  
Arthur Fabre <arthur@arthurfabre.com>  
Arthur Khashaev <arthur@khashaev.ru>  
Artur M. Wolff <artur.m.wolff@gmail.com>  
Artyom Pervukhin <artyom.pervukhin@gmail.com>  
Arvindh Rajesh Tamilmani <art@a-30.net>  
Ashish Bhate <ab.listsubs@gmail.com>  
Ashish Gandhi <ag@ashishgandhi.org>  
Asim Shankar <asimshankar@gmail.com>  
Assel Meher <asselmehar@gmail.com>  
Atin Malaviya <amalaviy@akamai.com>  
Ato Araki <ato.araki@gmail.com>  
Atsushi Toyama <atsushi.tohyama.160.333@gmail.com>  
Audrey Lim <audreylh@gmail.com>  
Audrius Butkevicius <audrius.butkevicius@gmail.com>  
Augusto Roman <aroman@gmail.com>  
Aulus Egnatius Varialus <varialus@gmail.com>  
Aurlien Rainone <aurelien.rainone@gmail.com>  
Aurlio A. Heckert <aurium@gmail.com>  
Austin Clements <austin@google.com> <aclements@csail.mit.edu>  
Avi Flax <avi@timehop.com>  
Aviv Klasquin Komissar <avivklas@gmail.com>  
awaw fumin <awawfumin@gmail.com>  
Awn Umar <awn@cryptolosophy.io>  
Axel Wagner <axel.wagner.hh@googlemail.com>  
Ayan George <ayan@ayan.net>  
Ayanamist Yang <ayanamist@gmail.com>  
Ayke van Laethem <aykevanlaethem@gmail.com>

Aymerick Jhanne <aymerick@jehanne.org>  
Ayzat Sadykov <ayzat.ziko.93@gmail.com>  
Azat Kaumov <kaumov.a.r@gmail.com>  
Baiju Muthukadan <baiju.m.mail@gmail.com>  
Balaram Makam <bmakam.qdt@qualcommdatacenter.com>  
Balazs Lecz <leczb@google.com>  
Baokun Lee <nototon@gmail.com> <bk@golangcn.org>  
Barnaby Keene <accounts@southcla.ws>  
Bartosz Grzybowski <melkorm@gmail.com>  
Bartosz Oler <brtsz@google.com>  
Bassam Ojeil <bojeil@google.com>  
Bastian Ike <bastian.ike@gmail.com>  
Ben Burkert <ben@benburkert.com>  
Ben Cartwright-Cox <Ben@Benjojo.co.uk>  
Ben Eitzen <eitzenb@golang.org>  
Ben Fried <ben.fried@gmail.com>  
Ben Haines <bhainesva@gmail.com>  
Ben Hoyt <benhoyt@gmail.com>  
Ben Hutchings <ben.hutchings@essensium.com>  
Ben Kraft <benkraft@khanacademy.org>  
Ben Laurie <ben@links.org> <benl@google.com>  
Ben Lubar <ben.lubar@gmail.com>  
Ben Lynn <benlynn@gmail.com>  
Ben Olive <sionide21@gmail.com>  
Ben Schwartz <bemasc@google.com>  
Ben Shi <powerman1st@163.com>  
Ben Toews <mastahyeti@gmail.com>  
Benjamin Barenblat <bbaren@google.com>  
Benjamin Black <b@b3k.us>  
Benjamin Cable <cable.benjamin@gmail.com>  
Benjamin Hsieh <tanookiben@users.noreply.github.com>  
Benjamin Peterson <benjamin@python.org>  
Benjamin Prosnitz <bprosnitz@google.com>  
Benjamin Wester <bwester@squareup.com>  
Benjamin Wuethrich <benjamin.wuethrich@gmail.com>  
Benny Siegert <bsiegert@gmail.com>  
Benoit Sigoure <tsunanet@gmail.com>  
Berengar Lehr <Berengar.Lehr@gmx.de>  
Berkant Ipek <41230766+0xbkt@users.noreply.github.com>  
Bharath Thiruveedula <tbharath91@gmail.com>  
Bhavin Gandhi <bhavin7392@gmail.com>  
Bill Neubauer <wcn@golang.org> <wcn@google.com> <bill.neubauer@gmail.com>  
Bill O'Farrell <billo@ca.ibm.com>  
Bill Prin <waprin@google.com>  
Bill Thiede <couchmoney@gmail.com>  
Bill Zissimopoulos <billziss@navimatics.com>  
Billie Harold Cleek <bhcleek@gmail.com>  
Billy Lynch <wlynch@google.com>

Billy Zaelani Malik <m.billyzaelani@gmail.com>  
Bjrn Erik Pedersen <bjorn.erik.pedersen@gmail.com>  
Bjorn Tillenius <bjorn@tillenius.me>  
Bjorn Tipling <bjorn.tipling@gmail.com>  
Blain Smith <rebelgeek@blainsmith.com>  
Blake Gentry <blakesgentry@gmail.com>  
Blake Mesdag <blakemesdag@gmail.com>  
Blake Mizerany <blake.mizerany@gmail.com>  
Blixt <me@blixt.nyc>  
Bob Briski <rbriski@gmail.com>  
Bob McNaughton <bobmcn@gmail.com>  
Bob Potter <bobby.potter@gmail.com>  
Bobby DeSimone <bobbydesimone@gmail.com>  
Bobby Powers <bobbypowers@gmail.com>  
Boqin Qin <bobbqqin@gmail.com>  
Boris Nagaev <nagaev@google.com>  
Borja Clemente <borja.clemente@gmail.com>  
Boshi Lian <bolian@microsoft.com>  
Brad Burch <brad.burch@gmail.com>  
Brad Erickson <bderickson@gmail.com>  
Brad Fitzpatrick <bradfitz@golang.org> <bradfitz@gmail.com>  
Brad Garcia <bgarcia@golang.org>  
Brad Jones <rbjones@google.com>  
Brad Morgan <brad@morgabra.com>  
Brad Whitaker <bwhitaker@fastly.com>  
Braden Bassingthwaite <bbassingthwaite@vendasta.com>  
Bradford Lamson-Scribner <brad.lamson@gmail.com>  
Bradley Falzon <brad@teambrod.net>  
Brady Catherman <brady@gmail.com>  
Brady Sullivan <brady@bsull.com>  
Branden J. Brown <zephyrtronium@gmail.com>  
Brandon Bennett <bbennett@fb.com>  
Brandon Gilmore <varz@google.com>  
Brandon Philips <brandon@ifup.org>  
Brandon Ryan <bjryan19@gmail.com>  
Brave Cow <rsr715@gmail.com>  
Brayden Cloud <bcloud@google.com>  
Brendan Daniel Tracey <tracey.brendan@gmail.com>  
Brendan O'Dea <bod@golang.org>  
Brett Cannon <bcannon@gmail.com>  
Brett Merrill <brett.j.merrill94@gmail.com>  
Brian Dellisanti <briandellisanti@gmail.com>  
Brian Downs <brian.downs@gmail.com>  
Brian Falk <falk@logicparty.org>  
Brian G. Merrell <bgmerrell@gmail.com>  
Brian Gitonga Marete <marete@tohornix.com> <bgmarete@gmail.com> <bgm@google.com>  
Brian Kennedy <btkenney@gmail.com>  
Brian Kessler <brian.m.kessler@gmail.com>

Brian Ketelsen <bketelsen@gmail.com>  
Brian Slesinsky <skybrian@google.com>  
Brian Smith <ohohvi@gmail.com>  
Brian Starke <brian.starke@gmail.com>  
Bryan Alexander <Kozical@msn.com>  
Bryan Boreham <bjboreham@gmail.com>  
Bryan C. Mills <bcmills@google.com>  
Bryan Chan <bryan.chan@ca.ibm.com>  
Bryan Ford <brynosaurus@gmail.com>  
Bryan Heden <b.heden@gmail.com>  
Bulat Gaifullin <gaifullinbf@gmail.com>  
Burak Guven <bguven@gmail.com>  
Caine Tighe <arctanofyourface@gmail.com>  
Caio Marcelo de Oliveira Filho <caio.oliveira@intel.com>  
Caleb Martinez <accounts@calebmartinez.com>  
Caleb Spare <cespare@gmail.com>  
Carl Chatfield <carlchatfield@gmail.com>  
Carl Henrik Lunde <chlunde@ifi.uio.no>  
Carl Jackson <carl@stripe.com>  
Carl Johnson <me@carlmjohnson.net>  
Carl Mastrangelo <notcarl@google.com>  
Carl Menezes <carleeto@gmail.com>  
Carl Shapiro <cshapiro@google.com> <cshapiro@golang.org>  
Carlisia Campos <carlisia@grokkingtech.io>  
Carlo Alberto Ferraris <cafxx@strayorange.com>  
Carlos Alexandro Becker <caarlos0@gmail.com>  
Carlos Amedee <carlos@golang.org>  
Carlos Castillo <cookieo9@gmail.com>  
Carlos Cirello <uldericofilho@gmail.com>  
Carlos Eduardo <me@carlosedp.com>  
Carlos Eduardo Seo <cseo@linux.vnet.ibm.com>  
Carlos Iriarte <ciriarte@gmail.com>  
Carlos Souza <carloshrsouza@gmail.com>  
Carolyn Van Slyck <me@carolynvanslyck.com>  
Carrie Bynon <cbynon@gmail.com>  
Carson Hoffman <c@rsonhoffman.com>  
Cary Hull <chull@google.com>  
Case Nelson <case.nelson@gmail.com>  
Casey Callendrello <squeed@gmail.com>  
Casey Marshall <casey.marshall@gmail.com>  
Catalin Nicutar <cnicutar@google.com>  
Catalin Patulea <catalinp@google.com>  
Cathal O'Callaghan <cathalsocallaghan@gmail.com>  
Cedric Staub <cs@squareup.com>  
Cezar S Espinola <cezarsa@gmail.com>  
Chad Rosier <mrosier.qdt@qualcommdatacenter.com>  
ChaiShushan <chaishushan@gmail.com>  
Changkun Ou <hi@changkun.us>

Channing Kimble-Brown <channing@golang.org>  
Chao Xu <xuchao@google.com>  
Charles Fenwick Elliott <Charles@FenwickElliott.io>  
Charles Kenney <charlesc.kenney@gmail.com>  
Charles L. Dorian <cldorian@gmail.com>  
Charles Lee <zombie.fml@gmail.com>  
Charles Weill <weill@google.com>  
Charlie Moog <moogcharlie@gmail.com>  
Charlotte Brandhorst-Satzkorn <catzkorn@gmail.com>  
Chauncy Cullitan <chauncyc@google.com>  
Chen Zhidong <njutczd@gmail.com>  
Chen Zhihan <energiehund@gmail.com>  
Cherry Mui <cherryyz@google.com>  
Chew Choon Keat <choonkeat@gmail.com>  
Chiawen Chen <golopot@gmail.com>  
Chirag Sukhala <cchirag77@gmail.com>  
Cholerae Hu <choleraehyq@gmail.com>  
Chotepud Teo <AlexRouSg@users.noreply.github.com>  
Chris Ball <chris@printf.net>  
Chris Biscardi <chris@christopherbiscardi.com>  
Chris Broadfoot <cbro@golang.org>  
Chris Dollin <ehog.hedge@gmail.com>  
Chris Farmiloe <chrisfarms@gmail.com>  
Chris Hines <chris.cs.guy@gmail.com>  
Chris Howey <howeyc@gmail.com>  
Chris Hundt <hundt@google.com>  
Chris Jones <chris@cjones.org> <chris.jones.yar@gmail.com>  
Chris Kastorff <encryptio@gmail.com>  
Chris Le Roy <brompwnie@users.noreply.github.com>  
Chris Lennert <calennert@gmail.com>  
Chris Liles <caveryliles@gmail.com>  
Chris Manghane <cmang@golang.org>  
Chris Marchesi <chrism@vanclueverttech.com>  
Chris McGee <sirnewton\_01@yahoo.ca> <newton688@gmail.com>  
Chris Raynor <raynor@google.com>  
Chris Roche <rodaine@gmail.com>  
Chris Smith <chrsmith@users.noreply.github.com>  
Chris Stockton <chrisstocktonaz@gmail.com>  
Chris Taylor <taylorza@gmail.com>  
Chris Waldon <christopher.waldon.dev@gmail.com>  
Chris Zou <chriszou@ca.ibm.com>  
Christian Alexander <christian@linux.com>  
Christian Couder <chriscool@tuxfamily.org>  
Christian Himpel <chressie@googlemail.com> <chressie@gmail.com>  
Christian Muehlhaeuser <muesli@gmail.com>  
Christian Pellegrin <chri@evolware.org>  
Christian R. Petrin <christianpetrin@gmail.com>  
Christian Svensson <blue@cmd.nu>

Christine Hansmann <chhansmann@gmail.com>  
Christoffer Buchholz <christoffer.buchholz@gmail.com>  
Christoph Blecker <admin@toph.ca>  
Christoph Hack <christoph@tux21b.org>  
Christopher Cahoon <chris.cahoon@gmail.com>  
Christopher Guiney <chris@guiney.net>  
Christopher Henderson <chris@chenderson.org>  
Christopher Hlubek <christopher.hlubek@networkteam.com>  
Christopher Koch <chrisko@google.com>  
Christopher Loessl <cloessl+github@gmail.com>  
Christopher Nelson <nadiasvertex@gmail.com>  
Christopher Nielsen <m4dh4tt3r@gmail.com>  
Christopher Redden <christopher.redden@gmail.com>  
Christopher Swenson <cswenson@google.com>  
Christopher Thomas <53317512+chrissstomas@users.noreply.github.com>  
Christopher Wedgwood <cw@f00f.org>  
Christos Zoulas <christos@zoulas.com> <zoulasc@gmail.com>  
Christy Perez <christy@linux.vnet.ibm.com>  
CL Sung <clsung@gmail.com> <cl\_sung@htc.com>  
Clment Chigot <clement.chigot@atos.net>  
Clement Skau <clementskau@gmail.com>  
Clint J. Edwards <clint.j.edwards@gmail.com>  
Cody Oss <the.cody.oss@gmail.com>  
Colby Ranger <cranger@google.com>  
Colin Arnott <colin@urandom.co.uk>  
Colin Cross <ccross@android.com>  
Colin Edwards <colin@recursivepenguin.com>  
Colin Kennedy <moshen.colin@gmail.com>  
Colin Nelson <colnnelson@google.com>  
Colin Rice <clr@google.com>  
Conrad Irwin <conrad.irwin@gmail.com>  
Conrad Meyer <cemeyer@cs.washington.edu>  
Conrado Gouvea <conradopl@gmail.com>  
Constantin Konstantinidis <constantinkonstantinidis@gmail.com>  
Corey Thomasson <cthom.lists@gmail.com>  
Corne van der Plas <vdplas@gmail.com>  
Cosmos Nicolaou <cnicolaou@google.com>  
Costin Chirvasuta <ctin@google.com>  
Craig Citro <craigcitro@google.com>  
Cristian Staretu <unclejacksons@gmail.com>  
Cristo Garca <cgg.code@gmail.com>  
cui fliter <imcusg@gmail.com>  
Cuihtlauac ALVARADO <cuihtlauac.alvarado@orange.com>  
Cuong Manh Le <cuong@orijtech.com>  
Curtis La Graff <curtis@lagraff.me>  
Cyrill Schumacher <cyrill@schumacher.fm>  
Dai Jie <gzdaijie@gmail.com>  
Daisuke Fujita <dtanshi45@gmail.com>

Daisuke Suzuki <daisuzu@gmail.com>  
Daker Fernandes Pinheiro <daker.fernandes.pinheiro@intel.com>  
Damian Gryski <dgryski@gmail.com>  
Damien Lespiau <damien.lespiau@gmail.com> <damien.lespiau@intel.com>  
Damien Mathieu <42@dmathieu.com>  
Damien Neil <dneil@google.com>  
Damien Tournoud <damien@platform.sh>  
Dan Ballard <dan@mindstab.net>  
Dan Caddigan <goldcaddy77@gmail.com>  
Dan Callahan <dan.callahan@gmail.com>  
Dan Harrington <harringtond@google.com>  
Dan Jacques <dnj@google.com>  
Dan Johnson <computerdruid@google.com>  
Dan McArdle <dmcardle@google.com>  
Dan Peterson <dpiddy@gmail.com>  
Dan Pupius <dan@medium.com>  
Dan Scales <danscales@google.com>  
Dan Sinclair <dan.sinclair@gmail.com>  
Daniel Cohen <dcohen@gatech.edu>  
Daniel Cormier <danielc@knowbe4.com>  
Danil de Kok <me@danieldk.eu>  
Daniel Fleischman <danielfleischman@gmail.com>  
Daniel Ingram <ingramds@appstate.edu>  
Daniel Johansson <dajo2002@gmail.com>  
Daniel Kerwin <d.kerwin@gini.net>  
Daniel Kessler <dkess@google.com>  
Daniel Krech <eikeon@eikeon.com>  
Daniel Kumor <rdkumor@gmail.com>  
Daniel Langner <s8572327@gmail.com>  
Daniel Lidn <daniel.liden.87@gmail.com>  
Daniel Lublin <daniel@lublin.se>  
Daniel Mangum <georgedanielmangum@gmail.com>  
Daniel Mart <mvdan@mvdan.cc>  
Daniel McCarney <cpu@letsencrypt.org>  
Daniel Morsing <daniel.morsing@gmail.com>  
Daniel Nadasi <dnadasi@google.com>  
Daniel Nephin <dnephin@gmail.com>  
Daniel Ortiz Pereira da Silva <daniel.particular@gmail.com>  
Daniel S. Fava <danielsfava@gmail.com>  
Daniel Skinner <daniel@dasa.cc>  
Daniel Speichert <daniel@speichert.pl>  
Daniel Theophanes <kardianos@gmail.com>  
Daniel Upton <daniel@floppy.co>  
Daniela Petruzalek <daniela.petruzalek@gmail.com>  
Danish Dua <danishdua@google.com>  
Danish Prakash <grafitykoncept@gmail.com>  
Danny Rosseau <daniel.rosseau@gmail.com>  
Daria Kolistratova <daria.kolistratova@intel.com>

Darien Raymond <admin@v2ray.com>  
Darren Elwood <darren@textnode.com>  
Darren Grant <darren.e.grant@gmail.com>  
Darren McCleary <darren.rmc@gmail.com>  
Darshan Parajuli <parajulidarshan@gmail.com>  
Datong Sun <dndx@idndx.com>  
Dave Borowitz <dborowitz@google.com>  
Dave Bort <dbort@golang.org>  
Dave Cheney <dave@cheney.net>  
Dave Day <djd@golang.org>  
Dave Grijalva <dgrijalva@ngmoco.com>  
Dave MacFarlane <driusan@gmail.com>  
Dave Pifke <dave@pifke.org>  
Dave Russell <forfuncsake@gmail.com>  
David Anderson <danderson@google.com>  
David Barnett <dbarnett@google.com>  
David Benjamin <davidben@google.com>  
David Black <dblack@atlassian.com>  
David Bond <davidsbond93@gmail.com>  
David Brophy <dave@brophy.uk>  
David Brgin <676c7473@gmail.com>  
David Calavera <david.calavera@gmail.com>  
David Carlier <devnexen@gmail.com>  
David Carter <fresco.raja@gmail.com>  
David Chase <drchase@google.com>  
David Covert <davidhcovert@gmail.com>  
David Crawshaw <david.crawshaw@zentus.com> <crawshaw@google.com> <crawshaw@golang.org>  
David du Colombier <0intro@gmail.com>  
David Finkel <david.finkel@gmail.com>  
David Forsythe <dforsythe@gmail.com>  
David G. Andersen <dave.andersen@gmail.com>  
David Glasser <glasser@meteor.com>  
David Golden <david@autopragmatic.com>  
David Heuschmann <heuschmann.d@gmail.com>  
David Howden <dhowden@gmail.com>  
David Hubbard <dsp@google.com>  
David Jakob Fritz <david.jakob.fritz@gmail.com>  
David Jones <dxjones@gmail.com>  
David Lazar <lazard@golang.org>  
David Leon Gil <coruus@gmail.com>  
David McLeish <davemc@google.com>  
David Ndungu <dnjuguna@gmail.com>  
David NewHamlet <david@newhamlet.com>  
David Presotto <presotto@gmail.com>  
David Qu <davidqu12345@gmail.com>  
David R. Jenni <david.r.jenni@gmail.com>  
David Sansome <me@davidsansome.com>  
David Stainton <dstainton415@gmail.com>

David Symonds <dsymonds@golang.org>  
David Thomas <davidthomas426@gmail.com>  
David Timm <dtimm@pivotal.io>  
David Titarenco <david.titarenco@gmail.com>  
David Tolpin <david.tolpin@gmail.com>  
David Url <david@urld.io>  
David Volquartz Lebech <david@lebech.info>  
David Wimmer <davidlwimmer@gmail.com>  
Davies Liu <davies.liu@gmail.com>  
Davor Kapsa <davor.kapsa@gmail.com>  
Dean Eigenmann <7621705+decanus@users.noreply.github.com>  
Dean Prichard <dean.prichard@gmail.com>  
Deepak Jois <deepak.jois@gmail.com>  
Deepak S <deepakspavoodath@gmail.com>  
Denis Bernard <db047h@gmail.com>  
Denis Brandolini <denis.brandolini@gmail.com>  
Denis Isaev <idenx@yandex.com>  
Denis Nagorny <denis.nagorny@intel.com>  
Dennis Kuhnert <mail.kuhnert@gmail.com>  
Denys Honsiorovskiy <honsiorovskiy@gmail.com>  
Denys Smirnov <denis.smirnov.91@gmail.com>  
Derek Buitenhuis <derek.buitenhuis@gmail.com>  
Derek Che <drc@yahoo-inc.com>  
Derek McGowan <derek@mcgstyle.net>  
Derek Parker <parkerderek86@gmail.com>  
Derek Phan <derekphan94@gmail.com>  
Derek Shockey <derek.shockey@gmail.com>  
Dev Ojha <dojha12@gmail.com>  
Dev Zhoujun <dev.zhoujun@gmail.com>  
Devon H. O'Dell <devon.odell@gmail.com>  
Dhaivat Pandit <dhaivatpandit@gmail.com>  
Dhananjay Nakrani <dhananjayn@google.com>  
Dhiru Kholia <dhiru.kholia@gmail.com>  
Dhruvdudd Jadhav <dhruvdudd.jadhav@gmail.com>  
Di Xiao <dixiao@google.com>  
Didier Spezia <didier.06@gmail.com>  
Diego Medina <fmpwizard@gmail.com>  
Diego Siqueira <diego9889@gmail.com>  
Dieter Plaetinck <dieter@raintank.io>  
Dilyn Corner <dilyn.corner@gmail.com>  
Dimitri Sokolyuk <sokolyuk@gmail.com>  
Dimitri Tcaciuc <dtcaciuc@gmail.com>  
Dina Garmash <dgrmsh@gmail.com>  
Diogo Pinela <diogoid7400@gmail.com>  
Dirk Gadsden <dirk@esherido.com>  
Diwaker Gupta <diwakergupta@gmail.com>  
Dmitri Goutnik <dgoutnik@gmail.com>  
Dmitri Popov <operator@cv.dp-net.com>

Dmitri Shuralyov <dmitshur@golang.org> <dmitri@shuralyov.com>  
Dmitrii Okunev <xaionaro@gmail.com>  
Dmitriy Cherchenko <dcherchenko@gmail.com>  
Dmitriy Dudkin <dudkin.dmitriy@gmail.com>  
Dmitriy Shelenin <deemok@googlemail.com> <deemok@gmail.com>  
Dmitriy Vyukov <dvyukov@google.com>  
Dmitry Chestnykh <dchest@gmail.com>  
Dmitry Doroginin <doroginin@gmail.com>  
Dmitry Mottl <dmitry.mottl@gmail.com>  
Dmitry Neverov <dmitry.neverov@gmail.com>  
Dmitry Savintsev <dsavints@gmail.com>  
Dmitry Yakunin <nonamezeil@gmail.com>  
Doga Fincan <doga@icloud.com>  
Domas Tamauskas <puerdomus@gmail.com>  
Domen Ipavec <domen@ipavec.net>  
Dominic Della Valle <ddvpublic@Gmail.com>  
Dominic Green <dominicgreen1@gmail.com>  
Dominik Honnef <dominik.honnef@gmail.com>  
Dominik Vogt <vogt@linux.vnet.ibm.com>  
Don Byington <don@dbyington.com>  
Donald Huang <don.hcd@gmail.com>  
Dong-hee Na <donghee.na92@gmail.com>  
Donovan Hide <donovanhide@gmail.com>  
Doug Anderson <douga@google.com>  
Doug Fawley <dfawley@google.com>  
Douglas Danger Manley <doug.manley@gmail.com>  
Drew Flower <drewvanstone@gmail.com>  
Drew Hintz <adhintz@google.com>  
Drew Richardson <drewrichardson@gmail.com>  
Duco van Amstel <duco.vanamstel@gmail.com>  
Duncan Holm <mail@frou.org>  
Dustin Carlino <dcarlino@google.com>  
Dustin Herbison <djherbis@gmail.com>  
Dustin Long <dustmop@gmail.com>  
Dustin Sallings <dsallings@gmail.com>  
Dustin Shields-Cloues <dcloues@gmail.com>  
Dvir Volk <dvir@everything.me> <dvirsky@gmail.com>  
Dylan Waits <dylan@waits.io>  
Ed Schouten <ed@nuxi.nl>  
Edan Bedrik <3d4nb3@gmail.com>  
Eddie Scholtz <escholtz@google.com>  
Eden Li <eden.li@gmail.com>  
Eduard Urbach <e.urbach@gmail.com>  
Eduardo Ramalho <eduardo.ramalho@gmail.com>  
Eduardo Villaseor <evillasrmx@gmail.com>  
Edward Muller <edwardam@interlix.com>  
Egon Elbre <egonelbre@gmail.com>  
Ehren Kret <ehren.kret@gmail.com>

Eitan Adler <lists@eitanadler.com>  
Eivind Uggedal <eivind@uggedal.com>  
El Mostafa Idrassi <el.mostafa.idrassi@gmail.com>  
Elbert Fliek <efliek@gmail.com>  
Eldar Rakhimberdin <ibeono@gmail.com>  
Elena Grahovac <elena@grahovac.me>  
Eli Bendersky <eliben@google.com>  
Elias Naur <mail@eliasnaur.com> <elias.naur@gmail.com>  
Elliot Morrison-Reed <elliottmr@gmail.com>  
Ellison Leao <ellisonleao@gmail.com>  
Elvina Yakubova <elvinayakubova@gmail.com>  
Emerson Lin <linyintor@gmail.com>  
Emil Bektimirov <lefelys@gmail.com>  
Emil Hessman <emil@hessman.se>  
Emil Mursalimov <mursalimovemeel@gmail.com>  
Emilien Kenler <hello@emilienkenler.com>  
Emmanuel Odeke <emm.odeke@gmail.com> <odeke@ualberta.ca>  
Emreacan Bati <emreacanbati@gmail.com>  
Eno Compton <enocom@google.com>  
Eoghan Sherry <ejsherry@gmail.com>  
Eric Biggers <ebiggers@google.com>  
Eric Brown <browne@vmware.com>  
Eric Chiang <eric.chiang.m@gmail.com>  
Eric Clark <zerohp@gmail.com>  
Eric Daniels <eric@erdaniels.com>  
Eric Engestrom <eric@engestrom.ch>  
Eric Garrido <ekg@google.com>  
Eric Koleda <ekoleda+devrel@google.com>  
Eric Lagergren <ericscottlagergren@gmail.com>  
Eric Milliken <emilliken@gmail.com>  
Eric Pauley <eric@pauley.me>  
Eric Ponce <tricokun@gmail.com>  
Eric Rescorla <ekr@rtfm.com>  
Eric Roshan-Eisner <eric.d.eisner@gmail.com>  
Eric Rutherford <erutherford@gmail.com>  
Eric Rykwalder <e.rykwalder@gmail.com>  
Eric Wang <>wangchaogo1990@gmail.com>  
Erick Tryzelaar <etryzelaar@google.com>  
Erik Aigner <aigner.erik@gmail.com>  
Erik Dubbelboer <erik@dubbelboer.com>  
Erik St. Martin <alakriti@gmail.com>  
Erik Staab <estaab@google.com>  
Erik Westrup <erik.westrup@gmail.com>  
Erin Masatsugu <erin.masatsugu@gmail.com>  
Ernest Chiang <ernest\_chiang@htc.com>  
Erwin Oegema <blablaechthema@hotmail.com>  
Esko Luontola <esko.luontola@gmail.com>  
Ethan Burns <eaburns@google.com>

Ethan Hur <ethan0311@gmail.com>  
Ethan Miller <eamiller@us.ibm.com>  
Euan Kemp <euank@euank.com>  
Eugene Formanenko <mo4islona@gmail.com>  
Eugene Kalinin <e.v.kalinin@gmail.com>  
Evan Broder <evan@stripe.com>  
Evan Brown <evanbrown@google.com>  
Evan Digby <evandigby@gmail.com>  
Evan Hicks <evan.hicks2@gmail.com>  
Evan Jones <ej@evanjones.ca>  
Evan Klitzke <evan@eklitzke.org>  
Evan Kroske <evankroske@google.com>  
Evan Martin <evan.martin@gmail.com>  
Evan Phoenix <evan@phx.io>  
Evan Shaw <chickencha@gmail.com>  
Evgeniy Kulikov <tuxuls@gmail.com>  
Evgeniy Polyakov <zbr@ioremap.net>  
Ewan Chou <coocood@gmail.com>  
Ewan Valentine <ewan.valentine89@gmail.com>  
Eyal Posener <posener@gmail.com>  
Fabian Wickborn <fabian@wickborn.net>  
Fabian Zaremba <fabian@youreemail.eu>  
Fabrizio Milo <mistobaan@gmail.com>  
Faiyaz Ahmed <ahmedf@vmware.com>  
Fan Hongjian <fan.howard@gmail.com>  
Fangming Fang <fangming.fang@arm.com>  
Fannie Zhang <fannie.zhang@arm.com>  
Fatih Arslan <fatih@arslan.io>  
Fazal Majid <majid@apsalar.com>  
Fazlul Shahriar <fshahriar@gmail.com>  
Federico Bond <federicobond@gmail.com>  
Federico Guerinoni <guerinoni.federico@gmail.com>  
Federico Simoncelli <fsimonce@redhat.com>  
Fedor Indutny <fedor@indutny.com>  
Fedor Korotkiy <dartslon@gmail.com>  
Felipe Oliveira <felipeweb.programador@gmail.com>  
Felix Bnemann <Felix.Buenemann@gmail.com>  
Felix Cornelius <9767036+fcornelius@users.noreply.github.com>  
Felix Geisendrfer <haimuiba@gmail.com>  
Felix Kollmann <fk@konsorten.de>  
Ferenc Szabo <frncmx@gmail.com>  
Fernandez Ludovic <lfernandez.dev@gmail.com>  
Filip Gruszczyski <gruszczyski@gmail.com>  
Filip Haglund <drathier@users.noreply.github.com>  
Filip Stanis <fstanis@google.com>  
Filippo Valsorda <filippo@golang.org> <filippo@cloudflare.com> <hi@filippo.io>  
Firmansyah Adiputra <frm.adiputra@gmail.com>  
Florian Forster <octo@google.com>

Florian Uekermann <florian@uekermann-online.de> <f1@uekermann-online.de>  
Florian Weimer <fw@deneb.enyo.de>  
Florin Patan <florinpatan@gmail.com>  
Folke Behrens <folke@google.com>  
Ford Hurley <ford.hurley@gmail.com>  
Francesc Campoy <campoy@golang.org>  
Francesco Guardiani <francescoguard@gmail.com>  
Francesco Renzi <rentziass@gmail.com>  
Francisco Claude <fclaude@recoded.cl>  
Francisco Rojas <francisco.rojas.gallegos@gmail.com>  
Francisco Souza <franciscossouza@gmail.com>  
Frank Schroeder <frank.schroeder@gmail.com>  
Frank Somers <fsomers@arista.com>  
Frederic Guillot <frederic.guillot@gmail.com>  
Frederick Kelly Mayle III <frederickmayle@gmail.com>  
Frederik Ring <frederik.ring@gmail.com>  
Frederik Zipp <fzipp@gmx.de>  
Fredrik Enestad <fredrik.enestad@soundtrackyourbrand.com>  
Fredrik Forsmo <fredrik.forsmo@gmail.com>  
Fredrik Wallgren <fredrik.wallgren@gmail.com>  
Frew Schmidt <github@frew.co>  
Frithjof Schulze <schulze@math.uni-hannover.de> <sfrithjof@gmail.com>  
Frits van Bommel <fvbommel@gmail.com>  
Fujimoto Kyosuke <kyoro.f@gmail.com>  
Fumitoshi Ukai <ukai@google.com>  
G. Hussain Chinoy <ghchinoy@gmail.com>  
Gaal Yahas <gaal@google.com>  
Gabrel Arthr Ptursson <gabriel@system.is>  
Gabriel Aszalos <gabriel.aszalos@gmail.com>  
Gabriel Guzman <gabe.guzman@gmail.com>  
Gabriel Nelle <tehsphinx@web.de>  
Gabriel Nicolas Avellaneda <avellaneda.gabriel@gmail.com>  
Gabriel Rosenhouse <rosenhouse@gmail.com>  
Gabriel Russell <gabriel.russell@gmail.com>  
Gabriel Vasile <gabriel.vasile0793@gmail.com>  
Gareth Paul Jones <gpj@foursquare.com>  
Garret Kelly <gdk@google.com>  
Garrick Evans <garrick@google.com>  
Garry McNulty <garrmcnu@gmail.com>  
Gary Burd <gary@beagledreams.com> <gary.burd@gmail.com>  
Gary Elliott <garyelliott@google.com>  
Gaurav Singh <gaurav1086@gmail.com>  
Gaurish Sharma <contact@gaurishsharma.com>  
Gautham Thambidorai <gautham.dorai@gmail.com>  
Gauthier Jolly <gauthier.jolly@gmail.com>  
Gawen Arab <gawen.arab@c.zen.ly>  
Geert-Johan Riemer <gjr19912@gmail.com>  
Genevieve Luyt <genevieve.luyt@gmail.com>

Gengliang Wang <ltnwgl@gmail.com>  
Geoff Berry <gberry.qdt@qualcommdatacenter.com>  
Geoffroy Lorieux <lorieux.g@gmail.com>  
Geon Kim <geon0250@gmail.com>  
Georg Reinke <guelfey@gmail.com>  
George Gkirtsou <ggirtsou@gmail.com>  
George Hartzell <hartzell@alerce.com>  
George Shammas <george@shamm.as> <georgyo@gmail.com>  
George Tsilias <tsilias@gmail.com>  
Gerasimos (Makis) Maropoulos <kataras2006@hotmail.com>  
Gerasimos Dimitriadis <gedimitr@gmail.com>  
Gergely Brautigam <skarlso777@gmail.com>  
Gernot Vormayr <gvormayr@gmail.com>  
Gert Cuykens <gert.cuykens@gmail.com>  
Getulio Snchez <valentin2507@gmail.com>  
Ghazni Nattarshah <ghazni.nattarshah@gmail.com>  
Gianguido Sora` <g.sora4@gmail.com>  
Gideon Jan-Wessel Redelinghuys <gjredelinghuys@gmail.com>  
Giles Lean <giles.lean@pobox.com>  
Giovanni Bajo <rasky@develer.com>  
GitHub User @180909 (70465953) <734461790@qq.com>  
GitHub User @6543 (24977596) <6543@obermui.de>  
GitHub User @aca (50316549) <acadx0@gmail.com>  
GitHub User @ajnrp (1688456) <ajnrp@users.noreply.github.com>  
GitHub User @ajz01 (4744634) <ajzdenek@gmail.com>  
GitHub User @alkesh26 (1019076) <alkesh26@gmail.com>  
GitHub User @andig (184815) <cpuidle@gmx.de>  
GitHub User @andrius4669 (4699695) <andrius4669@gmail.com>  
GitHub User @as (8127015) <as.utf8@gmail.com>  
GitHub User @bakape (7851952) <bakape@gmail.com>  
GitHub User @bgadrian (830001) <aditza8@gmail.com>  
GitHub User @bontequero (2674999) <bontequero@gmail.com>  
GitHub User @cch123 (384546) <buaa.cch@gmail.com>  
GitHub User @chainhelen (7046329) <chainhelen@gmail.com>  
GitHub User @chanxuehong (3416908) <chanxuehong@gmail.com>  
GitHub User @Cluas (10056928) <Cluas@live.cn>  
GitHub User @cncal (23520240) <flycalvin@qq.com>  
GitHub User @DQNEO (188741) <dqneo@gmail.com>  
GitHub User @Dreamacro (8615343) <chuainian@gmail.com>  
GitHub User @dupoxy (1143957) <dupoxy@users.noreply.github.com>  
GitHub User @EndlessCheng (7086966) <loli.con@qq.com>  
GitHub User @erifan (31343225) <eric.fang@arm.com>  
GitHub User @esell (9735165) <eujon.sellers@gmail.com>  
GitHub User @fatedier (7346661) <fatedier@gmail.com>  
GitHub User @frenkie (6499251) <mail@rhab.de>  
GitHub User @geedchin (11672310) <geedchin@gmail.com>  
GitHub User @GrigoriyMikhalkin (3637857) <grigoriymikhalkin@gmail.com>  
GitHub User @hengwu0 (41297446) <41297446+hengwu0@users.noreply.github.com>

GitHub User @hitzhangjie (3725760) <hit.zhangjie@gmail.com>  
GitHub User @hqpk0 (13887251) <whaibin01@hotmail.com>  
GitHub User @itchyny (375258) <itchyny@hatena.ne.jp>  
GitHub User @jinmiaoluo (39730824) <jinmiaoluo@icloud.com>  
GitHub User @jobbrown (6345470) <msshane2008@gmail.com>  
GitHub User @kazysshr (30496953) <kazysshr0301@gmail.com>  
GitHub User @kc1212 (1093806) <kc1212@users.noreply.github.com>  
GitHub User @komisan19 (18901496) <komiyama6219@gmail.com>  
GitHub User @Kropekk (13366453) <kamilkropiewnicki@gmail.com>  
GitHub User @lhl2617 (33488131) <l.h.lee2617@gmail.com>  
GitHub User @linguohua (3434367) <lghchinaidea@gmail.com>  
GitHub User @LotusFenn (13775899) <fenn.lotus@gmail.com>  
GitHub User @ly303550688 (11519839) <yang.liu636@gmail.com>  
GitHub User @madiganz (18340029) <zacharywmadigan@gmail.com>  
GitHub User @maltalex (10195391) <code@bit48.net>  
GitHub User @markruler (38225900) <csu0414@gmail.com>  
GitHub User @Matt966 (28551465) <Matt966@users.noreply.github.com>  
GitHub User @micnncim (21333876) <micnncim@gmail.com>  
GitHub User @mkishere (224617) <224617+mkishere@users.noreply.github.com>  
GitHub User @nu50218 (40682920) <nu\_ll@icloud.com>  
GitHub User @OlgaVIPetrova (44112727) <OVPPetrova@gmail.com>  
GitHub User @pityonline (438222) <pityonline@gmail.com>  
GitHub User @po3rin (29445112) <abctail30@gmail.com>  
GitHub User @pokutuna (57545) <popopopokutuna@gmail.com>  
GitHub User @povsister (11040951) <pov@mahou-shoujo.moe>  
GitHub User @pytimer (17105586) <lixin20101023@gmail.com>  
GitHub User @qcrao (7698088) <qcrao91@gmail.com>  
GitHub User @ramenjuniti (32011829) <ramenjuniti@gmail.com>  
GitHub User @saitarunreddy (21041941) <saitarunreddypalla@gmail.com>  
GitHub User @SataQiu (9354727) <shidaqiu2018@gmail.com>  
GitHub User @shogo-ma (9860598) <Choroma194@gmail.com>  
GitHub User @sivchari (55221074) <shibuuuu5@gmail.com>  
GitHub User @skanehira (7888591) <sho19921005@gmail.com>  
GitHub User @soolaugust (10558124) <soolaugust@gmail.com>  
GitHub User @surechen (7249331) <surechen17@gmail.com>  
GitHub User @tatsumack (4510569) <tatsu.mack@gmail.com>  
GitHub User @tell-k (26263) <ffk2005@gmail.com>  
GitHub User @tennashi (10219626) <tennashio@gmail.com>  
GitHub User @uhei (2116845) <uhei@users.noreply.github.com>  
GitHub User @uji (49834542) <ujiprogram@gmail.com>  
GitHub User @unbyte (5772358) <i@shangyes.net>  
GitHub User @uropek (39370426) <uropek@gmail.com>  
GitHub User @utkarsh-extc (53217283) <utkarsh.extc@gmail.com>  
GitHub User @witchard (4994659) <witchard@hotmail.co.uk>  
GitHub User @wolf1996 (5901874) <ksgiv37@gmail.com>  
GitHub User @yah01 (12216890) <kagaminehuan@gmail.com>  
GitHub User @yuanhh (1298735) <yuan415030@gmail.com>  
GitHub User @zikaeroh (48577114) <zikaeroh@gmail.com>

GitHub User @ZZMarquis (7624583) <zhonglingjian3821@163.com>  
Giulio Iotti <dullgiulio@gmail.com>  
Giulio Micheloni <giulio.micheloni@gmail.com>  
Giuseppe Valente <gvalente@arista.com>  
Gleb Stepanov <glebstepanov1992@gmail.com>  
Glenn Brown <glennb@google.com>  
Glenn Lewis <gmlewis@google.com>  
Gordon Klaus <gordon.klaus@gmail.com>  
Gordon Tyler <gordon@doxxx.net>  
Grace Han <hgrace503@gmail.com>  
Graham King <graham4king@gmail.com>  
Graham Miller <graham.miller@gmail.com>  
Grant Griffiths <ggp493@gmail.com>  
Green Lightning <GreenLightning.git@googlemail.com>  
Greg Poirier <greg.istehbest@gmail.com>  
Greg Steuck <gnezdo+github@google.com>  
Greg Thelen <gthelen@google.com>  
Greg Ward <greg@gerg.ca>  
Grgoire Delattre <gregoire.delattre@gmail.com>  
Gregory Man <man.gregory@gmail.com>  
Gregory Petrosyan <gregory.petrosyan@gmail.com>  
Guilherme Caruso <gui.martinscaruso@gmail.com>  
Guilherme Garnier <guilherme.garnier@gmail.com>  
Guilherme Goncalves <guilhermeaugustosg@gmail.com>  
Guilherme Rezende <guilhermebr@gmail.com>  
Guilherme Souza <32180229+gqgs@users.noreply.github.com>  
Guillaume J. Charmes <guillaume@charmes.net>  
Guillaume Sottas <guillaumesottas@gmail.com>  
Gnther Noack <gnoack@google.com>  
Guobiao Mei <meiguobiao@gmail.com>  
Guodong Li <guodongli@google.com>  
Guoliang Wang <iamwgliang@gmail.com>  
Gustav Paul <gustav.paul@gmail.com>  
Gustav Westling <gustav@westling.xyz>  
Gustavo Franco <gustavorfranco@gmail.com>  
Gustavo Niemeyer <gustavo@niemeyer.net> <n13m3y3r@gmail.com>  
Gwenael Treguier <gwenn.kahz@gmail.com>  
Gyu-Ho Lee <gyuhox@gmail.com>  
H. brahim Gngr <igungor@gmail.com>  
Hajime Hoshi <hajimehoshi@gmail.com>  
Hallgrimur Gunnarsson <halg@google.com>  
HAMANO Tsukasa <hamano@osstech.co.jp>  
Han-Wen Nienhuys <hanwen@google.com>  
Hang Qian <hangqian90@gmail.com>  
Hanjun Kim <hallazzang@gmail.com>  
Hanlin He <hanling.he@gmail.com>  
Hanlin Shi <shihanlin9@gmail.com>  
Haoran Luo <haoran.luo@chaitin.com>

Haosdent Huang <haosdent@gmail.com>  
Harald Nordgren <haraldnordgren@gmail.com>  
Hari haran <hariharan.uno@gmail.com>  
Hariharan Srinath <srinathh@gmail.com>  
Harley Laue <losinggeneration@gmail.com>  
Harry Moreno <morenoh149@gmail.com>  
Harshavardhana <hrshvardhana@gmail.com>  
Hasan Ozgan <hasan@ozgan.net>  
Hasit Bhatt <hasit.p.bhatt@gmail.com>  
Hauke Lffler <hloeffler@users.noreply.github.com>  
Hvard Haugen <havard.haugen@gmail.com>  
He Liu <liulonnie@gmail.com>  
Hector Chu <hectorchu@gmail.com>  
Hector Martin Cantero <hector@marcansoft.com>  
Hein Khant Zaw <heinkhantzaw1@gmail.com>  
Henning Schmiedehausen <henning@schmiedehausen.org>  
Henrik Edwards <henrik.edwards@gmail.com>  
Henrik Hodne <henrik@hodne.io>  
Henrique Vicente <henriquevicente@gmail.com>  
Henry Adi Sumarto <henry.adisumarto@gmail.com>  
Henry Bubert <google@mindeco.de>  
Henry Chang <mr.changyuheng@gmail.com>  
Henry Clifford <h.a.clifford@gmail.com>  
Henry Wong <liushuai.wang@elastic.co>  
Herbert Georg Fischer <herbert.fischer@gmail.com>  
Herbie Ong <herbie@google.com>  
Heschi Kreinick <heschi@google.com>  
Hidetatsu Yaginuma <ygnmhdtt@gmail.com>  
Hilko Bengen <bengen@hilluzination.de>  
Himanshu Kishna Srivastava <28himanshu@gmail.com>  
Hiroaki Nakamura <hnakamur@gmail.com>  
Hiromichi Ema <ema.hiro@gmail.com>  
Hironao OTSUBO <motemen@gmail.com>  
Hiroshi Ioka <hirochachacha@gmail.com>  
Hitoshi Mitake <mitake.hitoshi@gmail.com>  
Holden Huang <ttyh061@gmail.com>  
Hong Ruiqi <hongruiqi@gmail.com>  
Hongfei Tan <feilengcui008@gmail.com>  
Horacio Duran <horacio.duran@gmail.com>  
Horst Rutter <hhrutter@gmail.com>  
Hossein Sheikh Attar <hattar@google.com>  
Hossein Zolfi <hossein.zolfi@gmail.com>  
Howard Zhang <howard.zhang@arm.com>  
Hsin Tsao <tsao@google.com>  
Hsin-Ho Yeh <yhh92u@gmail.com>  
Hu Keping <hukeping@huawei.com>  
Huan Du <i@huandu.me>  
Hugues Bruant <hugues.bruant@gmail.com>

Huy Le <huy.dinh.le.89@gmail.com>  
Hyang-Ah Hana Kim <hakim@google.com> <hyangah@gmail.com>  
Hyoyoung Chang <hyoyoung@gmail.com>  
Ian Cottrell <iancottrell@google.com>  
Ian Davis <nospam@iandavis.com>  
Ian Gudger <ian@loosescre.ws>  
Ian Haken <ihaken@netflix.com>  
Ian Kent <iankent85@gmail.com>  
Ian Lance Taylor <iant@golang.org>  
Ian Leue <ian@appboy.com>  
Ian Mckay <iann0036@gmail.com>  
Ian Tay <iantay@google.com>  
Ian Woolf <btw515wolf2@gmail.com>  
Ian Zapolsky <ianzapolsky@gmail.com>  
Ibrahim AshShohail <ibra.sho@gmail.com>  
Icarus Sparry <golang@icarus.freeuk.com>  
Iccha Sethi <icchasethi@gmail.com>  
Ichinose Shogo <shogo82148@gmail.com>  
Idora Shinatose <idora.shinatose@gmail.com>  
Ignacio Hagopian <jsign.uy@gmail.com>  
Igor Bernstein <igorbernstein@google.com>  
Igor Bolotnikov <igor.v.bolotnikov@gmail.com>  
Igor Dolzhevik <bluesriverz@gmail.com>  
Igor Vashyst <ivashyst@gmail.com>  
Igor Zhilianin <igor.zhilianin@gmail.com>  
Ikko Ashimine <eltoclear@gmail.com>  
Ilya Yalovyy <yalovoy@gmail.com>  
Ilya Chukov <56119080+Elias506@users.noreply.github.com>  
Ilya Sineelnikov <sidhmangh@gmail.com>  
Ilya Tocar <ilya.tocar@intel.com>  
INADA Naoki <songofacandy@gmail.com>  
Inanc Gumus <m@inanc.io>  
Ingo Gottwald <in.gottwald@gmail.com>  
Ingo Krabbe <ikrabbe.ask@gmail.com>  
Ingo Oeser <nightlyone@googlemail.com> <nightlyone@gmail.com>  
Ioannis Georgoulas <geototti21@hotmail.com>  
Irbe Krumina <irbekrm@gmail.com>  
Irfan Sharif <irfanmahmoudsharif@gmail.com>  
Irieda Noboru <irieda@gmail.com>  
Isaac Ardis <isaac.ardis@gmail.com>  
Isaac Wagner <ibw@isaacwagner.me>  
Isfan Azhabil <isfanazhabil@gmail.com>  
Iskander Sharipov <iskander.sharipov@intel.com> <quasilyte@gmail.com>  
Issac Trotts <issactrotts@google.com>  
Ivan Babrou <ivan@cloudflare.com>  
Ivan Bertona <ivan.bertona@gmail.com>  
Ivan Krasin <krasin@golang.org>  
Ivan Kutuzov <arbrix@gmail.com>

Ivan Markin <sw@nogoegst.net>  
Ivan Moscoso <moscoso@gmail.com>  
Ivan Osadchiy <ivan.osadchii@gmail.com>  
Ivan Sharavuev <shpiwan@gmail.com>  
Ivan Trubach <mr.trubach@icloud.com>  
Ivan Ukhov <ivan.ukhov@gmail.com>  
Ivy Evans <ivy@ivyevans.net>  
Jaana Burcu Dogan <jbd@google.com> <jbd@golang.org> <burcujdogan@gmail.com>  
Jaap Aarts <jaap.aarts1@gmail.com>  
Jack Britton <jackxbritton@gmail.com>  
Jack Lindamood <jlindamo@justin.tv>  
Jacob Baskin <jbaskin@google.com>  
Jacob Blain Christen <dweomer5@gmail.com>  
Jacob H. Haven <jacob@cloudflare.com>  
Jacob Hoffman-Andrews <github@hoffman-andrews.com>  
Jacob Walker <jacobwalker0814@gmail.com>  
Jaden Teng <long.asyn@gmail.com>  
Jae Kwon <jae@tendermint.com>  
Jake B <doogie1012@gmail.com>  
Jakob Borg <jakob@nym.se>  
Jakob Weisblat <jakobw@mit.edu>  
Jakub ajka <jcajka@redhat.com>  
Jakub Kaczmarzyk <jakubk@mit.edu>  
Jakub Ryszard Czarnowicz <j.czarnowicz@gmail.com>  
Jakub Warczarek <jakub.warczarek@gmail.com>  
Jamal Carvalho <jamal.a.carvalho@gmail.com>  
James Aguilar <jaguilar@google.com>  
James Bardin <j.bardin@gmail.com>  
James Chacon <jchacon@google.com>  
James Clarke <jrtc27@jrtc27.com>  
James Cowgill <James.Cowgill@imgtec.com>  
James Craig Burley <james-github@burleyarch.com>  
James David Chalfant <james.chalfant@gmail.com>  
James Eady <jmeady@google.com>  
James Fennell <jpfennell@google.com>  
James Fysh <james.fysh@gmail.com>  
James Gray <james@james4k.com>  
James Hartig <fastest963@gmail.com>  
James Kasten <jdkasten@google.com>  
James Lawrence <jljatone@gmail.com>  
James Meneghello <rawrz0r@gmail.com>  
James Myers <jfmyers9@gmail.com>  
James Naftel <james.naftel@gmail.com>  
James Neve <jamesoneve@gmail.com>  
James Nugent <james@jen20.com>  
James P. Cooper <jamespcooper@gmail.com>  
James Robinson <jamesr@google.com> <jamesr.gatech@gmail.com>  
James Schofield <james@shoeboxapp.com>

James Smith <jrs1995@icloud.com>  
James Sweet <james.sweet88@googlemail.com>  
James Toy <nil@opensesame.st>  
James Treanor <jtreanor3@gmail.com>  
James Tucker <raggi@google.com>  
James Whitehead <jnwhiteh@gmail.com>  
Jamie Beverly <jamie.r.beverly@gmail.com>  
Jamie Gennis <jgennis@google.com> <jgennis@gmail.com>  
Jamie Kerr <jkerr113@googlemail.com>  
Jamie Liu <jamiliu@google.com>  
Jamie Stackhouse <contin673@gmail.com>  
Jamie Turner <jamwt@dropbox.com>  
Jamie Wilkinson <jaq@spacepants.org>  
Jamil Djadala <djadala@gmail.com>  
Jan Berktold <jan@berktold.co>  
Jan H. Hosang <jan.hosang@gmail.com>  
Jan Kratochvil <jan.kratochvil@redhat.com>  
Jan Lehnardt <jan@apache.org>  
Jan Mercl <0xjnml@gmail.com> <befelemepeseveze@gmail.com>  
Jan Newmarch <jan.newmarch@gmail.com>  
Jan Pilzer <jan.pilzer@gmx.de>  
Jan Steinke <jan.steinke@gmail.com>  
Jan Ziak <0xe2.0x9a.0x9b@gmail.com>  
Jani Monoses <jani.monoses@ubuntu.com> <jani.monoses@gmail.com>  
Jannis Andrija Schnitzer <jannis@schnitzer.im>  
Jared Allard <jaredallard@users.noreply.github.com>  
Jared Culp <jculp14@gmail.com>  
Jaroslavas Poepko <jp@webmaster.ms>  
Jason A. Donenfeld <Jason@zx2c4.com>  
Jason Baker <jason-baker@users.noreply.github.com>  
Jason Barnett <jason.w.barnett@gmail.com>  
Jason Buberel <jbuberel@google.com>  
Jason Chu <jasonchujc@gmail.com>  
Jason Del Ponte <delpontej@gmail.com>  
Jason Hall <jasonhall@google.com>  
Jason Keene <jasonkeene@gmail.com>  
Jason LeBrun <jblebrun@gmail.com>  
Jason Smale <jsmale@zendesk.com>  
Jason Travis <infomaniac7@gmail.com>  
Jason Wangsadinata <jwangsadinata@gmail.com>  
Javier Kohen <jkohen@google.com>  
Javier Revillas <jrevillas@massivedynamic.io>  
Javier Segura <javism@gmail.com>  
Jay Chen <chenjie@chenjie.info>  
Jay Conrod <jayconrod@google.com>  
Jay Lee <BusyJayLee@gmail.com>  
Jay Taylor <outtatime@gmail.com>  
Jay Weisskopf <jay@jayschwa.net>

Jean de Klerk <deklerk@google.com>  
Jean-Andr Santoni <jean.andre.santoni@gmail.com>  
Jean-Franois Bustarret <jf@bustarret.com>  
Jean-Francois Cantin <jfcantin@gmail.com>  
Jean-Marc Eurin <jmeurin@google.com>  
Jean-Nicolas Moal <jn.moal@gmail.com>  
Jed Denlea <jed@fastly.com>  
Jdrzej Szczepaniak <jbszczepaniak@gmail.com>  
Jeet Parekh <jeetparekh96@gmail.com>  
Jeevanandam M <jeeva@myjeeva.com>  
Jeff (Zhefu) Jiang <jeffjiang@google.com>  
Jeff Craig <jeffcraig@google.com>  
Jeff Dupont <jeff.dupont@gmail.com>  
Jeff Hodges <jeff@somethingsimilar.com>  
Jeff Johnson <jrjohnson@google.com>  
Jeff R. Allen <jra@nella.org> <jeff.allen@gmail.com>  
Jeff Sickel <jas@corpus-callosum.com>  
Jeff Wendling <jeff@spacemonkey.com>  
Jeff Widman <jeff@jeffwidman.com>  
Jeffrey H <jeffreyh192@gmail.com>  
Jelte Fennema <github-tech@jeltef.nl>  
Jens Frederich <jfrederich@gmail.com>  
Jeremiah Harmsen <jeremiah@google.com>  
Jeremy Banks <\_@jeremy.ca>  
Jeremy Canady <jcanady@gmail.com>  
Jeremy Faller <jeremy@golang.org>  
Jeremy Jackins <jeremyjackins@gmail.com>  
Jeremy Jay <jeremy@pbnjay.com>  
Jeremy Schlatter <jeremy.schlatter@gmail.com>  
Jero Bado <tokidokitalkyou@gmail.com>  
Jeroen Bobbeldijk <jerbob92@gmail.com>  
Jeroen Simonetti <jeroen@simonetti.nl>  
Jrme Doucet <jerdct@gmail.com>  
Jerrin Shaji George <jerrinsg@gmail.com>  
Jess Frazelle <me@jessfraz.com>  
Jesse Szwedko <jesse.szwedko@gmail.com>  
Jess Espino <jespinog@gmail.com>  
Jia Zhan <jzhan@uber.com>  
Jiacai Liu <jiacai2050@gmail.com>  
Jiahao Lu <lujjjh@gmail.com>  
Jianing Yu <jnyu@google.com>  
Jianqiao Li <jianqiaoli@google.com>  
Jiayu Yi <yijiayu@gmail.com>  
Jie Ma <jienius@outlook.com>  
Jihyun Yu <yjh0502@gmail.com>  
Jim Cote <jfcote87@gmail.com>  
Jim Kingdon <jim@bolt.me>  
Jim McGrath <jimmc2@gmail.com>

Jim Minter <jminter@redhat.com>  
Jimmy Frasche <soapboxcicero@gmail.com>  
Jimmy Zelinskie <jimmyzelinskie@gmail.com>  
Jin-wook Jeong <jeweljar@hanmail.net>  
Jingcheng Zhang <diogin@gmail.com>  
Jingguo Yao <yaojingguo@gmail.com>  
Jingnan Si <jingnan.si@gmail.com>  
Jinkun Zhang <franksnolf@gmail.com>  
Jiong Du <londevil@gmail.com>  
Jirka Dank <dnk@mail.muni.cz>  
Jiulong Wang <jiulongw@gmail.com>  
Joakim Sernbrant <serbaut@gmail.com>  
Joe Bowbeer <joe.bowbeer@gmail.com>  
Joe Cortopassi <joe@joecortopassi.com>  
Joe Farrell <joe2farrell@gmail.com>  
Joe Harrison <joehazzers@gmail.com>  
Joe Henke <joed.henke@gmail.com>  
Joe Kyo <xunianzu@gmail.com>  
Joe Poirier <jdpoirier@gmail.com>  
Joe Richey <joerichey@google.com>  
Joe Shaw <joe@joeshaw.org>  
Joe Sylve <joe.sylve@gmail.com>  
Joe Tsai <joetsai@digital-static.net>  
Joel Courtney <euphemize@gmail.com>  
Joel Ferrier <joelferrier@google.com>  
Joel Sing <joel@sing.id.au> <jsing@google.com>  
Jol Stemmer <jstemmer@google.com>  
Joel Stemmer <stemmertech@gmail.com>  
Joey Geiger <jgeiger@users.noreply.github.com>  
Johan Brandhorst <johan.brandhorst@gmail.com>  
Johan Euphrosine <proppy@google.com>  
Johan Jansson <johan.jansson@iki.fi>  
Johan Knutzen <johan@senri.se>  
Johan Sageryd <j@1616.se>  
Johannes Huning <johannes.huning@gmail.com>  
John Asmuth <jasmuth@gmail.com>  
John Bampton <jbampton@gmail.com>  
John Beisley <huin@google.com>  
John C Barstow <jbowtie@amathaine.com>  
John DeNero <denero@google.com>  
John Dethridge <jcd@golang.org>  
John Gibb <johngibb@gmail.com>  
John Gilik <john@jgilik.com>  
John Graham-Cumming <jgc@jgc.org> <jgrahamc@gmail.com>  
John Howard Palevich <jack.palevich@gmail.com>  
John Jago <johnjago@protonmail.com>  
John Jeffery <jjeffery@sp.com.au>  
John Jenkins <twodopeshaggy@gmail.com>

John Leidegren <john.leidegren@gmail.com>  
John McCabe <john@johnmccabe.net>  
John Moore <johnkenneth.moore@gmail.com>  
John Newlin <jnewlin@google.com>  
John Papandriopoulos <jpap.code@gmail.com>  
John Potocny <johnp@vividcortex.com>  
John R. Lenton <jlenton@gmail.com>  
John Schnake <schnake.john@gmail.com>  
John Shahid <jvshahid@gmail.com>  
John Tuley <john@tuley.org>  
John Weldon <johnweldon4@gmail.com>  
Johnny Luo <johnnyluo1980@gmail.com>  
Jon Chen <jchen@justin.tv>  
Jon Johnson <jonjohnson@google.com>  
Jonas Bernoulli <jonas@bernoul.li>  
Jonathan Albrecht <jonathan.albrecht@ibm.com>  
Jonathan Allie <jonallie@google.com>  
Jonathan Amsterdam <jba@google.com>  
Jonathan Boule <jonathanboule@gmail.com>  
Jonathan Chen <dijonkitchen@users.noreply.github.com>  
Jonathan Feinberg <feinberg@google.com>  
Jonathan Gold <jgold.bg@gmail.com>  
Jonathan Hseu <jhseu@google.com>  
Jonathan Mark <jhmark@xenops.com> <jhmark000@gmail.com>  
Jonathan Nieder <jrn@google.com>  
Jonathan Pentecost <pentecostjonathan@gmail.com>  
Jonathan Pittman <jmpittman@google.com> <jonathan.mark.pittman@gmail.com>  
Jonathan Rudenberg <jonathan@titanous.com>  
Jonathan Stacks <jonstacks13@gmail.com>  
Jonathan Swinney <jswinney@amazon.com>  
Jonathan Wills <runningwild@gmail.com>  
Jonathon Lacher <jonathon.lacher@gmail.com>  
Jongmin Kim <atomaths@gmail.com>  
Joonas Kuorilehto <joneskoo@derbian.fi>  
Joop Kieft <ikojba@gmail.com> <joop@kiefte.net>  
Jordan Christiansen <xordspar0@gmail.com>  
Jordan Krage <jmank88@gmail.com>  
Jordan Lewis <jordanthelewis@gmail.com>  
Jordan Liggitt <liggitt@google.com>  
Jordan Rhee <jordanrh@microsoft.com>  
Jordan Rupprecht <rupprecht@google.com>  
Jordi Martin <jordimartin@gmail.com>  
Jorge Araya <jorgejavieran@yahoo.com.mx>  
Jorge L. Fatta <jorge.fatta@auth0.com>  
Jos Visser <josv@google.com>  
Josa Gesell <josa@gesell.me>  
Jose Luis Vquez Gonzlez <josvazg@gmail.com>  
Joseph Bonneau <jcb@google.com>

Joseph Holsten <joseph@josephholsten.com>  
Joseph Morag <sefim96@gmail.com>  
Josh Baum <joshbaum@google.com>  
Josh Bleecher Snyder <josharian@gmail.com>  
Josh Chorlton <jchorlton@gmail.com>  
Josh Deprez <josh.deprez@gmail.com>  
Josh Goebel <dreamer3@gmail.com>  
Josh Hoak <jhoak@google.com>  
Josh Holland <jrh@joshh.co.uk>  
Josh Rickmar <jrick@companyzero.com>  
Josh Roppo <joshroppo@gmail.com>  
Josh Varga <josh.varga@gmail.com>  
Joshua Bezaleel Abednego <joshua.bezaleel@gmail.com>  
Joshua Boelter <joshua.boelter@intel.com>  
Joshua Chase <jcjosuachase@gmail.com>  
Joshua Crowgey <jcrowgey@uw.edu>  
Joshua Harshman <joshgreyhat@gmail.com>  
Joshua M. Clulow <josh.clulow@joyent.com>  
Joshua Rubin <joshua@rubixconsulting.com>  
Josselin Costanzi <josselin@costanzi.fr>  
Jostein Stuhauug <js@solidsystem.no>  
JP Sugarbroad <jpsugar@google.com>  
JT Olds <jtolds@xnet5.com>  
JT Olio <hello@jtolio.com>  
Juan Carlos <juanjcsr@gmail.com>  
Juan Pablo Civile <elementohb@gmail.com>  
Jude Pereira <judebpereira@gmail.com>  
Jukka-Pekka Kekkonen <karatepekka@gmail.com>  
Julia Hansbrough <flowerhack@google.com>  
Julian Kornberger <jk+github@digineo.de>  
Julian Pastarmov <pastarmovj@google.com>  
Julian Phillips <julian@quantumfyre.co.uk>  
Julian Tibble <julian.tibble@gmail.com>  
Julie Qiu <julie@golang.org>  
Julien Kauffmann <julien.kauffmann@freelan.org>  
Julien Salleyron <julien.salleyron@gmail.com>  
Julien Schmidt <google@julienschmidt.com>  
Julien Tant <julien@craftyx.fr>  
Julio Montes <julio.montes@intel.com>  
Jun Zhang <jim.zoumo@gmail.com>  
Junchen Li <junchen.li@arm.com>  
Junda Liu <junda@celer.network>  
Jungho Ahn <jhahn@google.com>  
Junya Hayashi <ledmonster@gmail.com>  
Juraj Sukop <sukop@users.noreply.github.com>  
Jure Ham <jure.ham@zemanta.com>  
Justin Gracenin <jgracenin@gmail.com>  
Justin Li <git@justinli.net>

Justin Nu <nuss.justin@gmail.com>  
Justyn Temme <justyntemme@gmail.com>  
Kai Backman <kaib@golang.org>  
Kai Dong <dokia2357@gmail.com>  
Kai Lke <kai@kinvolk.io>  
Kai Trukenmller <ktye78@gmail.com>  
Kale Blankenship <kale@lemnisis.com>  
Kaleb Elwert <kelwert@atlassian.com>  
Kalman Bekesi <kalmanb@google.com>  
Kamal Aboul-Hosn <aboulhosn@google.com>  
Kamil Chmielewski <kamil.chm@gmail.com>  
Kamil Kisiel <kamil@kamilkisiel.net> <kamil.kisiel@gmail.com>  
Kamil Rytarowski <krytarowski@users.noreply.github.com>  
Kang Hu <hukangustc@gmail.com>  
Kanta Ebihara <kantaebihara@gmail.com>  
Karan Dhiman <karandhi@ca.ibm.com>  
Karel Pazdera <pazderak@gmail.com>  
Karoly Negyesi <chx1975@gmail.com>  
Karsten Khler <karsten.koehler95@gmail.com>  
Karthik Nayak <karthik.188@gmail.com>  
Kashav Madan <kshvmdn@gmail.com>  
Kate Manson <kate.manson@izettle.com>  
Katharine Berry <ktbry@google.com>  
Katie Hockman <katie@golang.org>  
Kato Kazuyoshi <kato.kazuyoshi@gmail.com>  
Katrina Owen <katrina.owen@gmail.com>  
Kaviraj Kanagaraj <kavirajkanagaraj@gmail.com>  
Kay Zhu <kayzhu@google.com>  
Kazuhiro Sera <seratch@gmail.com>  
KB Sriram <kbsriram@google.com>  
Keegan Carruthers-Smith <keegan.csmith@gmail.com>  
Kei Son <hey.calmdown@gmail.com>  
Keiichi Hirobe <challenge.akane@gmail.com>  
Keiji Yoshida <keijiyoshida.mail@gmail.com>  
Keisuke Kishimoto <keisuke.kishimoto@gmail.com>  
Keith Ball <inflatablewoman@gmail.com>  
Keith Randall <khr@golang.org>  
Keith Rarick <kr@xph.us>  
Kelly Heller <pestophagous@gmail.com>  
Kelsey Hightower <kelsey.hightower@gmail.com>  
Kelvin Foo Chuan Lyi <vmirage@gmail.com>  
Kemal Elmizan <kemalelmizan@gmail.com>  
Ken Friedenbach <kenliz@cruzio.com>  
Ken Rockot <ken@oz.gs> <ken.rocket@gmail.com>  
Ken Sedgwick <ken@bonsai.com>  
Ken Thompson <ken@golang.org>  
Kenichi Tsunokawa <kenichi.tsunokawa@gmail.com>  
Kenji Kaneda <kenji.kaneda@gmail.com>

Kenji Yano <kenji.yano@gmail.com>  
Kenneth Shaw <kenshaw@gmail.com>  
Kenny Grant <kennygrant@gmail.com>  
Kensei Nakada <handbomusic@gmail.com>  
Kenta Mori <zoncoen@gmail.com>  
Kerollos Magdy <kerolloz@yahoo.com>  
Ketan Parmar <ketanbparmar@gmail.com>  
Kevan Swanberg <kevswanberg@gmail.com>  
Kevin Albertson <kevin.albertson@mongodb.com>  
Kevin Ballard <kevin@sb.org>  
Kevin Burke <kev@inburke.com>  
Kvin Dunglas <dunglas@gmail.com>  
Kevin Gillette <extemporalgenome@gmail.com>  
Kevin Herro <kevin109104@gmail.com>  
Kevin Kirsche <kev.kirsche@gmail.com>  
Kevin Klues <klueska@gmail.com> <klueska@google.com>  
Kevin Malachowski <chowski@google.com>  
Kevin Parsons <kevpar@microsoft.com>  
Kevin Ruffin <kruffin@gmail.com>  
Kevin Vu <kevin.m.vu@gmail.com>  
Kevin Zita <bleedgreenandgold@gmail.com>  
Keyan Pishdadian <kpishdadian@gmail.com>  
Keyuan Li <keyuanli123@gmail.com>  
Kezhu Wang <kezhuw@gmail.com>  
Khosrow Moossavi <khos2ow@gmail.com>  
Kieran Colford <kieran@kcolford.com>  
Kim Shrier <kshrier@racktopsystems.com>  
Kim Yongbin <kybinz@gmail.com>  
Kir Kolyshkin <kolyshkin@gmail.com>  
Kirill Korotaev <kirillx@gmail.com>  
Kirill Motkov <Motkov.Kirill@gmail.com>  
Kirill Smelkov <kirr@nexedi.com>  
Kirill Tatchihin <kirabsuir@gmail.com>  
Kirk Han <kirk91.han@gmail.com>  
Kirklin McDonald <kirklin.mcdonald@gmail.com>  
KJ Tsanaksidis <ktsanaksidis@zendesk.com>  
Klaus Post <klauspost@gmail.com>  
Kodie Goodwin <kodiegoodwin@gmail.com>  
Koichi Shiraishi <zchee.io@gmail.com>  
Koki Ide <niconegoto@yahoo.co.jp>  
Koki Tomoshige <tomocy.dev@gmail.com>  
Komu Wairagu <komuw05@gmail.com>  
Konstantin <konstantin8105@gmail.com>  
Konstantin Shaposhnikov <k.shaposhnikov@gmail.com>  
Koya IWAMURA <kiwamura0314@gmail.com>  
Kris Kwiatkowski <kris@cloudflare.com>  
Kris Nova <kris@nivenly.com>  
Kris Rousey <krousey@google.com>

Krishna Birla <krishnabirla16@gmail.com>  
Kristopher Watts <traetox@gmail.com>  
Krzysztof Dbrowski <krzysdabro@live.com>  
Kshitij Saraogi <kshitijgaraogi@gmail.com>  
Kun Li <likunarmstrong@gmail.com>  
Kunpei Sakai <namusyaka@gmail.com>  
Kuntal Majumder <hellozee@disroot.org>  
Kush Patel <kush.patel@hootsuite.com>  
Kyle Consalus <consalus@gmail.com>  
Kyle Isom <kyle@gokyle.net>  
Kyle Jones <kyle@kyledj.com>  
Kyle Lemons <kyle@kylelemons.net> <kevlar@google.com>  
Kyle Nusbaum <kyle@datadog.com>  
Kyle Shannon <kyle@pobox.com>  
Kyle Spiers <eiais@google.com>  
Kyle Wood <kyle@kylewood.cc>  
Kyohei Kadota <lufia@lufia.org>  
Kirylo Silin <silin@kirylo.org>  
L Campbell <unpansu@gmail.com>  
Lai Jiangshan <eag0628@gmail.com>  
Lajos Papp <lalyos@yahoo.com>  
Lakshay Garg <lakshay.garg.1996@gmail.com>  
Lann Martin <lanm@google.com>  
Lanre Adelowo <yo@lanre.wtf>  
Lapo Luchini <lapo@lapo.it>  
Larry Clapp <larry@theclapp.org>  
Larry Hosken <lahosken@golang.org>  
Lars Jeppesen <jeppesen.lars@gmail.com>  
Lars Lehtonen <lars.lehtonen@gmail.com>  
Lars Wiegman <lars@namsral.com>  
Larz Conwell <larzconwell@gmail.com>  
Laurent Voisin <lpvoisin@gmail.com>  
Laurie Clark-Michalek <laurie@qubit.com>  
LE Manh Cuong <cuong.manhle.vn@gmail.com>  
Lee Hinman <hinman@gmail.com>  
Lee Packham <lpackham@gmail.com>  
Lehner Florian <dev@der-flo.net>  
Leigh McCulloch <leighmcc@gmail.com>  
Leo Antunes <leo@costela.net>  
Leo Rudberg <ljr@google.com>  
Leon Klingele <git@leonklingele.de>  
Leonard Wang <>wangdeyu0907@gmail.com>  
Leonardo Comelli <leonardo.comelli@gmail.com>  
Leonel Quinteros <leonel.quinteros@gmail.com>  
Lev Shamardin <shamardin@gmail.com>  
Lewin Bormann <lewin.bormann@gmail.com>  
Lewis Waddicor <nemesismk2@gmail.com>  
Liam Haworth <liam@haworth.id.au>

Lily Chung <lilithkchung@gmail.com>  
Lingchao Xin <douglarek@gmail.com>  
Lion Yang <lion@aosc.xyz>  
Liz Rice <liz@lizrice.com>  
Lize Cai <lizzcai1@gmail.com>  
Lloyd Dewolf <foolswisdom@gmail.com>  
Llus Batlle i Rossell <viric@viric.name>  
Lorenz Bauer <lmb@cloudflare.com>  
Lorenz Brun <lorenz@brun.one>  
Lorenz Nickel <mail@lorenznickel.de>  
Lorenzo Masini <rugginoso@develer.com>  
Lorenzo Stoakes <lstoakes@gmail.com>  
Louis Kruger <louisk@google.com>  
Luan Santos <cfcluan@gmail.com>  
Lubomir I. Ivanov <neolit123@gmail.com>  
Luca Bruno <luca.bruno@coreos.com>  
Luca Greco <luca.greco@alcacoop.it>  
Luca Spiller <luca@stackednotion.com>  
Lucas Bremgartner <lucas.bremgartner@gmail.com>  
Lucas Clemente <lclemente@google.com>  
Lucien Stuker <lucien.stuker@gmail.com>  
Lucio De Re <lucio.dere@gmail.com>  
Ludi Rehak <ludi317@gmail.com>  
Luigi Riefolo <luigi.riefolo@gmail.com>  
Luit van Drongelen <luitvd@gmail.com>  
Luka Zakrajek <tr00.g33k@gmail.com>  
Luka Zitnik <luka.zitnik@gmail.com>  
Lukasz Milewski <lmmilewski@gmail.com>  
Luke Champine <luke.champine@gmail.com>  
Luke Curley <qpingu@gmail.com>  
Luke Granger-Brown <git@lukegb.com>  
Luke Shumaker <lukeshu@datawire.io>  
Luke Young <bored-engineer@users.noreply.github.com>  
Luna Duclos <luna.duclos@palmstonegames.com>  
Luuk van Dijk <lvd@golang.org> <lvd@google.com>  
Lyle Franklin <lylejfranklin@gmail.com>  
Lynn Boger <laboger@linux.vnet.ibm.com>  
Ma Peiqi <mapeiqi2017@gmail.com>  
Maarten Bezemer <maarten.bezemer@gmail.com>  
Maciej Dbski <maciejd@google.com>  
Madhu Rajanna <madhupr007@gmail.com>  
Magnus Hiie <magnus.hiie@gmail.com>  
Mahdi Hosseini Moghaddam <seyed.mahdi.hosseini.moghaddam@ibm.com>  
Maia Lee <maia.lee@leftfieldlabs.com>  
Maicon Costa <maiconscosta@gmail.com>  
Mak Kolybabi <mak@kolybabi.com>  
Maksym Trykur <maksym.trykur@gmail.com>  
Mal Curtis <mal@mal.co.nz>

Manfred Touron <m@42.am>  
Manigandan Dharmalingam <manigandan.jeff@gmail.com>  
Manish Goregaokar <manishsmail@gmail.com>  
Manlio Perillo <manlio.perillo@gmail.com>  
Manoj Dayaram <platform-dev@moovweb.com> <manoj.dayaram@moovweb.com>  
Mansour Rahimi <rahimi.mnr@gmail.com>  
Manu Garg <manugarg@google.com>  
Manu S Ajith <neo@codingarena.in>  
Manuel Mendez <mmendez534@gmail.com>  
Marat Khabibullin <marat.khabibullin@jetbrains.com>  
Marc Sanmiquel <marcsanmiquel@gmail.com>  
Marc Weistroff <marc@weistroff.net>  
Marc-Antoine Ruel <maruel@chromium.org>  
Marcel Edmund Franke <marcel.edmund.franke@gmail.com>  
Marcel van Lohuizen <mpvl@golang.org>  
Marcelo Cantos <marcelo.cantos@gmail.com>  
Marcelo E. Magallon <marcelo.magallon@gmail.com>  
Marco Gazerro <gazerro@open2b.com>  
Marco Hennings <marco.hennings@freiheit.com>  
Marcus Weiner <marcus.weiner@gmail.com>  
Marcus Willock <crazcalm@gmail.com>  
Marga Manterola <marga@google.com>  
Mariano Cano <mariano@smallstep.com>  
Marin Bai <marin.basic02@gmail.com>  
Mario Arranz <marioarranzr@gmail.com>  
Marius A. Eriksen <marius@grailbio.com>  
Marius Nuennerich <mnu@google.com>  
Mark Adams <mark@markadams.me>  
Mark Bucciarelli <mkbucc@gmail.com>  
Mark Dain <mark@markdain.net>  
Mark Glines <mark@glines.org>  
Mark Harrison <marhar@google.com>  
Mark Percival <m@mdp.im>  
Mark Pulford <mark@kyne.com.au>  
Mark Rushakoff <mark.rushakoff@gmail.com>  
Mark Ryan <mark.d.ryan@intel.com>  
Mark Severson <miquella@gmail.com>  
Mark Theunissen <mark.theunissen@gmail.com>  
Mark Villacampa <m@markvillacampa.com>  
Mark Wolfe <mark@wolfe.id.au>  
Mark Zavislak <zavislak@google.com>  
Marko Juhani Silokunnas <marko.silokunnas@gmail.com>  
Marko Kevac <marko@kevac.org>  
Marko Kungla <marko.kungla@gmail.com>  
Marko Mikulicic <mkm@google.com>  
Marko Mudrinic <mudrinic.mare@gmail.com>  
Marko Tiikkaja <marko@joh.to>  
Markus Duft <markus.duft@salomon.at>

Markus Sonderegger <marraison@gmail.com>  
Markus Zimmermann <zimmski@gmail.com>  
Marten Seemann <martenseemann@gmail.com>  
Martin Asquino <martin.asquino@gmail.com>  
Martin Bertschler <mbertschler@gmail.com>  
Martin Garton <garton@gmail.com>  
Martin Habbecke <marhab@google.com>  
Martin Hamrle <martin.hamrle@gmail.com>  
Martin Hoefling <martin.hoefling@gmx.de>  
Martin Kreichgauer <martinkr@google.com>  
Martin Kunc <martinkunc@users.noreply.github.com>  
Martin Lindhe <martin.j.lindhe@gmail.com>  
Martin Mohrmann <moehrmann@google.com> <martisch@uos.de>  
Martin Neubauer <m.ne@gmx.net>  
Martin Olsen <github.com@martinolsen.net>  
Martin Olsson <martin@minimum.se>  
Martin Probst <martin@probst.io>  
Martin Sucha <anty.sk+git@gmail.com>  
Martin Tournoij <martin@arp242.net>  
Martins Sipenko <martins.sipenko@gmail.com>  
Martynas Budrinas <mabu@google.com>  
Marvin Stenger <marvin.stenger94@gmail.com>  
Marwan Sulaiman <marwan.sulaiman@work.co>  
Maryan Hratson <gmarik@gmail.com>  
Masahiro Furudate <masahiro.furudate@gmail.com>  
Masahiro Wakame <vvakame@gmail.com>  
Masaki Yoshida <yoshida.masaki@gmail.com>  
Masaya Watanabe <sfbgwm30@gmail.com>  
Mat Byczkowski <mbyczkowski@gmail.com>  
Mat Ryer <thatmatryer@gmail.com>  
Mt Gulys <mgulyas86@gmail.com>  
Matej Bao <matejbaco@gmail.com>  
Mateus Amin <mateus.amin@gmail.com>  
Mateusz Czapliski <czapkofan@gmail.com>  
Matheus Alcantara <matheusssilv97@gmail.com>  
Mathias Beke <git@denbeke.be>  
Mathias Hall-Andersen <mathias@hall-andersen.dk>  
Mathias Leppich <mleppich@muhqu.de>  
Mathieu Lonjaret <mathieu.lonjaret@gmail.com>  
Mats Lidell <mats.lidell@cag.se> <mats.lidell@gmail.com>  
Matt Aimonetti <mattaimonetti@gmail.com>  
Matt Blair <me@matthewblair.net>  
Matt Bostock <matt@mattbostock.com>  
Matt Brown <mbrown@google.com>  
Matt Dee <mdee@hioscar.com>  
Matt Drollette <matt@drollette.com>  
Matt Harden <matt.harden@gmail.com>  
Matt Jibson <matt.jibson@gmail.com>

Matt Joiner <anacrolix@gmail.com>  
Matt Jones <mrjones@google.com>  
Matt Juran <thepciet@gmail.com>  
Matt Layher <mdllyher@gmail.com>  
Matt Masurka <masurka@google.com>  
Matt Pearing <broskies@google.com>  
Matt Reiferson <mreiferson@gmail.com>  
Matt Robenolt <matt@ydekproductions.com>  
Matt Strong <mstrong1341@gmail.com>  
Matt T. Proud <matt.proud@gmail.com>  
Matt Williams <gh@mattyw.net> <mattyjwilliams@gmail.com>  
Matthew Brennan <matty.brennan@gmail.com>  
Matthew Broberg <matthewbbroberg@gmail.com>  
Matthew Cottingham <mattcottingham@gmail.com>  
Matthew Dempsky <mdempsky@google.com>  
Matthew Denton <mdenton@skyportsystems.com>  
Matthew Holt <Matthew.Holt+git@gmail.com>  
Matthew Horsnell <matthew.horsnell@gmail.com>  
Matthew Waters <mwwaters@gmail.com>  
Matthias Frei <matthias.frei@inf.ethz.ch>  
Matthieu Hauglustaine <matt.hauglustaine@gmail.com>  
Matthieu Olivier <olivier.matthieu@gmail.com>  
Matthijs Kooijman <matthijs@stdin.nl>  
Mattias Appelgren <mattias@ppelgren.se>  
Mauricio Alvarado <mauricio.alvarado@leftfieldlabs.com>  
Max Drosdo.ww <g1ran1q@gmail.com>  
Max Riveiro <kavu13@gmail.com>  
Max Schmitt <max@schmitt.mx>  
Max Semenik <maxsem.wiki@gmail.com>  
Max Ushakov <ushmax@gmail.com>  
Maxim Eryomenko <moeryomenko@gmail.com>  
Maxim Khitrov <max@mxcrypt.com>  
Maxim Pimenov <mpimenov@google.com>  
Maxim Pugachev <pugachev.mm@gmail.com>  
Maxim Ushakov <ushakov@google.com>  
Maxime de Roucy <maxime.deroucy@gmail.com>  
Mximo Cuadros Ortiz <mcuadros@gmail.com>  
Maxwell Krohn <themax@gmail.com>  
Maya Rashish <maya@NetBSD.org>  
Mayank Kumar <krmayankk@gmail.com>  
Mehrad Sadeghi <2012.linkinpark@gmail.com>  
Meir Fischer <meirfischer@gmail.com>  
Meng Zhuo <mengzhuo1203@gmail.com> <mzh@golangcn.org>  
Mhd Sulhan <m.shulhan@gmail.com>  
Mia Zhu <CrystalZhu1025getu@gmail.com>  
Micah Stetson <micah.stetson@gmail.com>  
Michael Anthony Knyszek <mknyszek@google.com>  
Michael Brandenburg <mbrandenburg@bolste.com>

Michael Chaten <mchaten@gmail.com>  
Michael Cook <code@mdcook.net>  
Michael Darakananda <pongad@google.com>  
Michael Dorner <mail@michaeldorf.de>  
Michael Edwards <medwards@walledcity.ca>  
Michael Elkins <michael.elkins@gmail.com>  
Michael Ellis <micellis@justin.tv>  
Michael Fraenkel <michael.fraenkel@gmail.com>  
Michael Fromberger <michael.j.fromberger@gmail.com>  
Michael Gehring <mg@ebfe.org> <gnirheg.leahcim@gmail.com>  
Michael Henderson <mdhender@users.noreply.github.com>  
Michael Hendricks <michael@ndrix.org>  
Michael Hoisie <hoisie@gmail.com>  
Michael Hudson-Doyle <michael.hudson@linaro.org>  
Michael Kasch <michael.kasch@gmail.com>  
Michael Kufel <golang@c.michael-kaeufl.de>  
Michael Kelly <mjk@google.com>  
Michal Lvesque-Dion <mlevesquedion@google.com>  
Michael Lewis <mikelikespie@gmail.com>  
Michael MacInnis <Michael.P.MacInnis@gmail.com>  
Michael Marineau <michael.marineau@coreos.com>  
Michael Matloob <matloob@google.com>  
Michael McConville <momconville@gmail.com>  
Michael McGreevy <mcgreevy@golang.org>  
Michael McLoughlin <mmcloughlin@gmail.com>  
Michael Munday <mike.munday@ibm.com>  
Michael Pearson <mipearson@gmail.com>  
Michael Piatek <piatek@google.com>  
Michael Pratt <mpratt@google.com>  
Michael Schaller <michael@5challer.de>  
Michael Schurter <michael.schurter@gmail.com>  
Michael Shields <mshields@google.com>  
Michael Stapelberg <michael@stapelberg.de> <mstplbrg@googlemail.com>  
Michael Steinert <mike.steinert@gmail.com>  
Michael T. Jones <mtj@google.com> <michael.jones@gmail.com>  
Michael Teichgraber <mteichgraber@gmx.de> <mt4swm@googlemail.com>  
Michael Traver <mtraver@google.com>  
Michael Vetter <g.bluehut@gmail.com>  
Michael Vogt <mvo@ubuntu.com>  
Michail Kargakis <mkargaki@redhat.com>  
Michal Bohuslvek <mbohuslvek@gmail.com>  
Michal Cierniak <cierniak@google.com>  
Micha Derkacz <zitek@inet.pl>  
Michal Franc <lam.michal.franc@gmail.com>  
Michal owicki <mlowicki@gmail.com>  
Michal Pristas <michal.pristas@gmail.com>  
Michal Rostecki <mrostecki@suse.de>  
Michal Stokluska <mstoklus@redhat.com>

Michalis Kargakis <michaliskargakis@gmail.com>  
Michel Lespinasse <>walken@google.com>  
Michel Leveux <mleieux42@gmail.com>  
Michele Di Pede <michele.di.pede@gmail.com>  
Mickael Kerjean <mickael.kerjean@gmail.com>  
Mickey Reiss <mickeyreiss@gmail.com>  
Miek Gieben <miek@miek.nl> <remigius.gieben@gmail.com>  
Miguel Acero <acero@google.com>  
Miguel Mendez <stxmendez@gmail.com>  
Miguel Molina <hi@mvader.me>  
Mihai Borobocea <MihaiBorobocea@gmail.com>  
Mihai Moldovan <ionic@ionic.de>  
Mihai Todor <todormihai@gmail.com>  
Mihail Minaev <minaev.mike@gmail.com>  
Mikael Tillenius <mikti42@gmail.com>  
Mike Andrews <mra@xoba.com>  
Mike Appleby <mike@app.leby.org>  
Mike Danese <mikedanese@google.com>  
Mike Houston <mike@kothar.net>  
Mike Kabischev <kabischev@gmail.com>  
Mike Rosset <mike.rosset@gmail.com>  
Mike Samuel <mikesamuel@gmail.com>  
Mike Solomon <msolo@gmail.com>  
Mike Strosaker <strosake@us.ibm.com>  
Mike Tsao <mike@sowbug.com>  
Mike Wiacek <mjwiacek@google.com>  
Mikhail Fesenko <proggga@gmail.com>  
Mikhail Gusarov <dottedmag@dottedmag.net>  
Mikhail Panchenko <m@mihasya.com>  
Miki Tebeka <miki.tebeka@gmail.com>  
Mikio Hara <mikioh.mikioh@gmail.com>  
Mikkel Krautz <mikkel@krautz.dk> <krautz@gmail.com>  
Mikoaj Baranowski <mikolajb@gmail.com>  
Milan Knezevic <milan.knezevic@mips.com>  
Milan Patel <bicelot3@gmail.com>  
Milutin Jovanovic <jovanovic.milutin@gmail.com>  
MinJae Kwon <mingrammer@gmail.com>  
Miquel Sabat Sol <mikisabate@gmail.com>  
Mirko Hansen <baaazen@gmail.com>  
Miroslav Genov <mgenov@gmail.com>  
Misty De Meo <mistydemeo@gmail.com>  
Mohamed Attahri <mohamed@attahri.com>  
Mohit Agarwal <mohit@sdf.org>  
Mohit kumar Bajoria <mohitbajo36@gmail.com>  
Mohit Verma <vmohit.93@gmail.com>  
Momchil Velikov <momchil.velikov@gmail.com>  
Monis Khan <mkhan@redhat.com>  
Monty Taylor <mordred@inaugust.com>

Moritz Fain <moritz@fain.io>  
Moriyoshi Koizumi <mozo@mozo.jp>  
Morten Siebuhr <sbhr@sbhr.dk>  
Mshe van der Sterre <moshevds@gmail.com>  
Mostyn Bramley-Moore <mostyn@antipode.se>  
Mrunal Patel <mrunalp@gmail.com>  
Muhammad Falak R Wani <falakreyaz@gmail.com>  
Muhammad Hamza Farrukh <hamzafarrukh141@gmail.com>  
Muhammed Uluyol <uluyol0@gmail.com>  
Muir Manders <muir@mnd.rs>  
Mukesh Sharma <sharma.mukesh439@gmail.com>  
Mura Li <mura\_li@castech.com.tw>  
Mykhailo Lesyk <mikhail@lesyk.org>  
Nahum Shalman <nahamu@gmail.com>  
Naman Aggarwal <aggarwal.nam@gmail.com>  
Naman Gera <namangera15@gmail.com>  
Nan Deng <monnand@gmail.com>  
Nao Yonashiro <owan.orisano@gmail.com>  
Naoki Kanatani <k12naoki@gmail.com>  
Natanael Copa <ncopa@mirantis.com>  
Nate Wilkinson <nathanwilk7@gmail.com>  
Nathan Cantelmo <n.cantelmo@gmail.com>  
Nathan Caza <mastercactus@gmail.com>  
Nathan Dias <nathan.dias@orijtech.com>  
Nathan Fiscaletti <nathan.fiscaletti@vrazo.com>  
Nathan Humphreys <nkhumphreys@gmail.com>  
Nathan John Youngman <nj@nathany.com>  
Nathan Otterness <otterness@cs.unc.edu>  
Nathan P Finch <nate.finch@gmail.com>  
Nathan VanBenschoten <nvanbenschoten@gmail.com>  
Nathan Youngman <git@nathany.com>  
Nathan(yinian) Hu <nathanhu@google.com>  
Nathaniel Cook <nvcook42@gmail.com>  
Naveen Kumar Sangi <naveenkumarsangi@protonmail.com>  
Neeilan Selvalingam <neeilan96@gmail.com>  
Neelesh Chandola <neelesh.c98@gmail.com>  
Nehal J Wani <nehaljw.kkd1@gmail.com>  
Neil Lyons <nwjlyons@googlemail.com>  
Neuman Vong <neuman.vong@gmail.com>  
Neven Sajko <nsajko@gmail.com>  
Nevins Bartolomeo <nevins.bartolomeo@gmail.com>  
Niall Sheridan <nsheridan@gmail.com>  
Nic Day <nic.day@me.com>  
Nicholas Asimov <nicholas@asimov.me>  
Nicholas Katsaros <nick@nickkatsaros.com>  
Nicholas Maniscalco <nicholas@maniscalco.com>  
Nicholas Ng <nickng@nickng.io>  
Nicholas Presta <nick@nickpresta.ca> <nick1presta@gmail.com>

Nicholas Sullivan <nicholas.sullivan@gmail.com>  
Nicholas Waples <nwaples@gmail.com>  
Nick Anthony <Liberatys@outlook.com>  
Nick Cooper <nmvc@google.com>  
Nick Craig-Wood <nick@craig-wood.com> <nickcw@gmail.com>  
Nick Harper <nharper@google.com>  
Nick Kubala <nkubala@google.com>  
Nick Leli <nicholasleli@gmail.com>  
Nick Miyake <nmiyake@users.noreply.github.com>  
Nick Patavalis <nick.patavalis@gmail.com>  
Nick Petroni <npetroni@cs.umd.edu>  
Nick Robinson <nrobinson13@gmail.com>  
Nick Smolin <nick27surgut@gmail.com>  
Nicolas BRULEZ <n.brulez@gmail.com>  
Nicolas Kaiser <nikai@nikai.net>  
Nicolas Owens <mischief@offblast.org>  
Nicolas S. Dade <nic.dade@gmail.com>  
Niek Sanders <niek.sanders@gmail.com>  
Niels Widger <niels.widger@gmail.com>  
Nigel Kerr <nigel.kerr@gmail.com>  
Nigel Tao <nigeltao@golang.org>  
Nik Nyby <nnyby@columbia.edu>  
Nikhil Benesch <nikhil.benesch@gmail.com>  
Nikita Gillmann <nikita@n0.is> <ng0@n0.is>  
Nikita Kryuchkov <nkryuchkov10@gmail.com>  
Nikita Melekhin <nimelehin@gmail.com>  
Nikita Vanyasin <nikita.vanyasin@gmail.com>  
Niklas Schnelle <niklas.schnelle@gmail.com>  
Niko Dziemba <niko@dziemba.com>  
Nikolay Turpitko <nikolay@turpitko.com>  
Nikson Kanti Paul <nikson.sust@gmail.com>  
Nils Larsgrd <nilsmagnus@gmail.com>  
Nir Soffer <nirsof@gmail.com>  
Niranjan Godbole <niranjan8192@gmail.com>  
Nishanth Shanmugham <nishanth.gerrard@gmail.com>  
Noah Campbell <noahcampbell@gmail.com>  
Noah Goldman <noahg34@gmail.com>  
Noah Santschi-Cooney <noah@santschi-cooney.ch>  
Noble Johnson <noblepoly@gmail.com>  
Nodir Turakulov <nodir@google.com>  
Noel Georgi <git@frezbo.com>  
Norberto Lopes <nlopes.ml@gmail.com>  
Norman B. Lancaster <qbradq@gmail.com>  
Nuno Cruces <ncruces@users.noreply.github.com>  
Obei Sideg <obei.sideg@gmail.com>  
Obeyda Djefal <djefobey@gmail.com>  
Odin Ugedal <odin@ugedal.com>  
Oleg Bulatov <dimage@yandex-team.ru>

Oleg Vakheta <helginet@gmail.com>  
Oleku Konko <oleku.konko@gmail.com>  
Oling Cat <olingcat@gmail.com>  
Oliver Hookins <ohookins@gmail.com>  
Oliver Powell <oliverpowell84@gmail.com>  
Oliver Stenbom <ostenbom@pivotal.io>  
Oliver Tan <otan@cockroachlabs.com>  
Oliver Tonnhofer <olt@bogosoftware.com>  
Olivier Antoine <olivier.antoine@gmail.com>  
Olivier Duperray <duperray.olivier@gmail.com>  
Olivier Poitrey <rs@dailymotion.com>  
Olivier Saingre <osaingre@gmail.com>  
Olivier Wulveryck <olivier.wulveryck@gmail.com>  
Omar Jarjur <ojarjur@google.com>  
Onkar Jadhav <omjadhav2610@gmail.com>  
Ori Bernstein <ori@eigenstate.org>  
Ori Rawlings <orirawlings@gmail.com>  
Oryan Moshe <iamoryanmoshe@gmail.com>  
Osamu TONOMORI <osamingo@gmail.com>  
zgr Kesim <oec-go@kesim.org>  
Pablo Caderno <kaderno@gmail.com>  
Pablo Lalloni <plalloni@gmail.com>  
Pablo Rozas Larraondo <pablo.larraondo@anu.edu.au>  
Pablo Santiago Blum de Aguiar <scorpus@gmail.com>  
Padraig Kitterick <padraigkitterick@gmail.com>  
Pallat Anchaleechamaikorn <yod.pallat@gmail.com>  
Pan Chenglong <1004907659@qq.com>  
Panos Georgiadis <pgeorgiadis@suse.de>  
Pantelis Sampaziotis <psampaz@gmail.com>  
Paolo Giarrusso <p.giarrusso@gmail.com>  
Paolo Martini <mrtnpaolo@gmail.com>  
Parker Moore <parkrmoore@gmail.com>  
Parminder Singh <parmsingh101@gmail.com>  
Pascal Dierich <pascal@pascaldierich.com>  
Pascal S. de Kloe <pascal@quies.net>  
Paschalis Tsilias <paschalis.tsilias@gmail.com>  
Pasi Thkp <pasi.tahkapaa@gmail.com>  
Pat Moroney <pat@pat.email>  
Patrick Barker <barkerp@vmware.com>  
Patrick Crosby <patrick@stathat.com>  
Patrick Gavlin <pgavlin@gmail.com>  
Patrick Gundlach <gundlach@speeddata.de>  
Patrick Higgins <patrick.allen.higgins@gmail.com>  
Patrick Jones <ithuriel@google.com>  
Patrick Lee <pattyshack101@gmail.com>  
Patrick Mzard <patrick@mezard.eu>  
Patrick Mylund Nielsen <patrick@patrickmn.com>  
Patrick Pelletier <pp.pelletier@gmail.com>

Patrick Riley <pfr@google.com>  
Patrick Smith <pat42smith@gmail.com>  
Patrik Lundin <patrik@sigterm.se>  
Paul A Querna <paul.querna@gmail.com>  
Paul Borman <borman@google.com>  
Paul Boyd <boyd.paul2@gmail.com>  
Paul Chang <paulchang@google.com>  
Paul D. Weber <x0bdev@gmail.com>  
Paul Davis <43160081+Pawls@users.noreply.github.com>  
Paul E. Murphy <murp@ibm.com>  
Paul Forgey <paulf@tessier-ashpool.net>  
Paul Hammond <paul@paulhammond.org>  
Paul Hankin <paulhankin@google.com>  
Paul Jolly <paul@myitcv.org.uk>  
Paul Lalonde <paul.a.lalonde@gmail.com>  
Paul M Furley <paul@paulfurley.com>  
Paul Marks <pmarks@google.com>  
Paul Meyer <paul.meyer@microsoft.com>  
Paul Nasrat <pnasrat@google.com>  
Paul PISCUC <paul.piscuc@gmail.com>  
Paul Querna <pquerna@apache.org>  
Paul Rosania <paul.rosania@gmail.com>  
Paul Ruest <pruest@gmail.com>  
Paul Sbarra <Sbarra.Paul@gmail.com>  
Paul Smith <paulsmith@pobox.com> <paulsmith@gmail.com>  
Paul Tyng <paul@paultyng.net>  
Paul van Brouwershaven <paul@vanbrouwershaven.com>  
Paul Wankadia <junyer@google.com>  
Paulo Casaretto <pcasaretto@gmail.com>  
Paulo Flabiano Smorigo <pfsmorigo@linux.vnet.ibm.com>  
Paulo Gomes <paulo.gomes.uk@gmail.com>  
Pavel Paulau <pavel.paulau@gmail.com>  
Pavel Watson <watsonpavel@gmail.com>  
Pavel Zinovkin <pavel.zinovkin@gmail.com>  
Pavlo Sumkin <ymkins@gmail.com>  
Pawel Knap <pawelknap88@gmail.com>  
Pawel Szczur <filemon@google.com>  
Pawe Szulik <pawel.szulik@intel.com>  
Pei Xian Chee <luciolas1991@gmail.com>  
Pei-Ming Wu <p408865@gmail.com>  
Pen Tree <appletree2479@outlook.com>  
Peng Gao <peng.gao.dut@gmail.com>  
Percy Wegmann <ox.to.a.cart@gmail.com>  
Perry Abbott <perry.j.abbott@gmail.com>  
Petar Dambovaliev <petar.atanasov.1987@gmail.com>  
Petar Maymoukov <petarm@gmail.com>  
Peter Armitage <peter.armitage@gmail.com>  
Peter Bourgon <peter@bourgon.org>

Peter Collingbourne <pcc@google.com>  
Peter Conerly <pconerly@gmail.com>  
Peter Dotchev <dotchev@gmail.com>  
Peter Froehlich <peter.hans.froehlich@gmail.com>  
Peter Gonda <pgonda@google.com>  
Peter Hoyes <pahoyes@gmail.com>  
Peter Kleiweg <pkleiweg@xs4all.nl>  
Peter McKenzie <petermck@google.com>  
Peter Moody <pmoody@uber.com>  
Peter Morjan <pmorjan@gmail.com>  
Peter Mundy <go.peter.90@gmail.com>  
Peter Nguyen <peter@mictis.com>  
Pter Surnyi <speter.gol@gmail.com>  
Pter Szab <pts@google.com>  
Pter Szilgyi <peterke@gmail.com>  
Peter Teichman <pteichman@fastly.com>  
Peter Tseng <ptseng@squareup.com>  
Peter Waldschmidt <peter@waldschmidt.com>  
Peter Waller <peter.waller@gmail.com>  
Peter Weinberger <pjw@golang.org>  
Peter Williams <pwil3058@gmail.com>  
Peter Wu <pwu@cloudflare.com>  
Peter Zhang <i@ddatsh.com>  
Petr Jedin <petr.jediny@gmail.com>  
Petrica Voicu <pvoicu@paypal.com>  
Phil Pearl <philip.j.r.pearl@gmail.com>  
Phil Pennock <pdp@golang.org>  
Philip Brgesen <philip.borgesen@gmail.com>  
Philip Brown <phil@bolthole.com>  
Philip Hofer <phofer@umich.edu>  
Philip K. Warren <pkwarren@gmail.com>  
Philip Nelson <me@pnelson.ca>  
Philipp Sauter <sauterp@protonmail.com>  
Philipp Stephani <phst@google.com>  
Phillip Campbell <15082+phillc@users.noreply.github.com>  
Pierre Carru <pierre.carru@eshard.com>  
Pierre Durand <pierredurand@gmail.com>  
Pierre Prinetti <pierreprinetti@gmail.com>  
Pierre Roullon <pierre.roullon@gmail.com>  
Piers <google@hellopiers.pro>  
Pieter Droogendijk <pieter@binky.org.uk>  
Pietro Gagliardi <pietro10@mac.com>  
Piyush Mishra <piyush@codeitout.com>  
Plekhanov Maxim <kishtatix@gmail.com>  
Poh Zi How <poh.zihow@gmail.com>  
Polina Osadcha <polliosa@google.com>  
Pontus Leitzler <leitzler@gmail.com>  
Povilas Versockas <p.versockas@gmail.com>

Prajwal Koirala <16564273+Prajwal-Koirala@users.noreply.github.com>  
Prasanga Siripala <pj@pjebs.com.au>  
Prasanna Swaminathan <prasanna@mediamath.com>  
Prashant Agrawal <prashant.a.vjti@gmail.com>  
Prashant Varanasi <prashant@prashantv.com>  
Praveen Kumar <praveen+git@kumar.in>  
Pravendra Singh <hackpravj@gmail.com>  
Preetam Jinka <pj@preet.am>  
Pure White <wu.purewhite@gmail.com>  
Qais Patankar <qaisjp@gmail.com>  
Qiuxuan Zhu <ilsh1022@gmail.com>  
Quan Tran <qeed.quan@gmail.com>  
Quan Yong Zhai <qyzhai@gmail.com>  
Quentin Perez <qperez@ocs.online.net>  
Quentin Renard <contact@asticode.com>  
Quentin Smith <quentin@golang.org>  
Quey-Liang Kao <s101062801@m101.nthu.edu.tw>  
Quim Muntal <quimmuntal@gmail.com>  
Quinn Slack <sq@sourcegraph.com>  
Quinten Yearsley <qyearsley@chromium.org>  
Quoc-Viet Nguyen <afelion@gmail.com>  
Rabin Gaire <rabingaire20@gmail.com>  
Radek Simko <radek.simko@gmail.com>  
Radek Sohlich <sohlich@gmail.com>  
Radu Berinde <radu@cockroachlabs.com>  
Rafal Jeczalik <rjeczalik@gmail.com>  
Raghavendra Nagaraj <jamdagni86@gmail.com>  
Rahul Bajaj <rahulrb0509@gmail.com>  
Rahul Chaudhry <rahulchaudhry@chromium.org>  
Rahul Wadhvani <rahulwadhvani21@gmail.com>  
Raif S. Naffah <go@naffah-raif.name>  
Rajat Goel <rajat.goel2010@gmail.com>  
Rajath Agasthya <rajathagasthya@gmail.com>  
Rajender Reddy Kompally <rajenderreddykompally@gmail.com>  
Ralph Corderoy <ralph@inputplus.co.uk>  
Ramazan AYYILDIZ <rayyildiz@gmail.com>  
Ramesh Dharan <dharan@google.com>  
Randy Reddig <randy@alta.software>  
Raph Levien <raph@google.com>  
Raphael Geronimi <raphael.geronimi@gmail.com>  
Raul Silvera <rsilvera@google.com>  
Ravil Bikbulatov <weeellz12@gmail.com>  
RaviTeja Pothana <ravi.tezu@gmail.com>  
Ray Tung <rtung@thoughtworks.com>  
Ray Wu <ray@liftoff.io>  
Raymond Kazlauskas <raima220@gmail.com>  
Rebecca Stambler <rstambler@golang.org>  
Reilly Watson <reillywatson@gmail.com>

Reinaldo de Souza Jr <juniorz@gmail.com>  
Remi Gillig <remigillig@gmail.com>  
Rmy Oudompheng <oudomphe@phare.normalesup.org> <remyoudompheng@gmail.com>  
Ren Ogaki <re.yuz77777@gmail.com>  
Rens Rikkerink <Ikkerens@users.noreply.github.com>  
Rhys Hiltner <rhys@justin.tv>  
Ricardo Padilha <ricardospadilha@gmail.com>  
Ricardo Pchevuzinske Katz <ricardo.katz@serpro.gov.br>  
Ricardo Seriani <ricardo.seriani@gmail.com>  
Richard Barnes <rlb@ipv.sx>  
Richard Crowley <r@rcrowley.org>  
Richard Dingwall <rdingwall@gmail.com>  
Richard Eric Gavaletz <gavaletz@gmail.com>  
Richard Gibson <richard.gibson@gmail.com>  
Richard Miller <miller.research@gmail.com>  
Richard Musiol <mail@richard-musiol.de> <neelance@gmail.com>  
Richard Pickering <richard.pickering@hotmail.co.uk>  
Richard Ulmer <codesoap@mailbox.org>  
Richard Wilkes <wilkes@me.com>  
Rick Arnold <rickarnoldjr@gmail.com>  
Rick Hudson <rlh@golang.org>  
Rick Sayre <whorfin@gmail.com>  
Rijnard van Tonder <rvantonder@gmail.com>  
Riku Voipio <riku.voipio@linaro.org>  
Risto Jaakko Saarelm <rsaarelm@gmail.com>  
Rob Earhart <earhart@google.com>  
Rob Findley <rfindley@google.com>  
Rob Norman <rob.norman@infinitycloud.com>  
Rob Phoenix <rob@robphoenix.com>  
Rob Pike <r@golang.org>  
Robert Ayrapetyan <robert.ayrapetyan@gmail.com>  
Robert Daniel Kortschak <dan.kortschak@adelaide.edu.au> <dan@kortschak.io>  
Robert Dinu <r@varp.se>  
Robert Figueiredo <robfig@gmail.com>  
Robert Griesemer <gri@golang.org>  
Robert Hencke <robert.hencke@gmail.com>  
Robert Iannucci <iannucci@google.com>  
Robert Kuska <rkuska@gmail.com>  
Robert Obryk <robryk@gmail.com>  
Robert Seseek <rseseek@google.com>  
Robert Snedegar <roberts@google.com>  
Robert Stepanek <robert.stepanek@gmail.com>  
Robert van Gent <rvangent@google.com>  
Robert-Andr Mauchin <zebob.m@gmail.com>  
Roberto Clapis <robclap8@gmail.com>  
Roberto Selbach <roberto@selbach.ca>  
Robin Eklind <r.eklind.87@gmail.com>  
Robin Zhong <robin@robinzhong.co>

Rodolfo Carvalho <rhcavalho@gmail.com>  
Rodolfo Rodriguez <rodolfobgibson@gmail.com>  
Rodrigo Moraes de Oliveira <rodrigo.moraes@gmail.com>  
Rodrigo Rafael Monti Kochenburger <divoxx@gmail.com>  
Roger Pau Monn <royger@gmail.com>  
Roger Peppe <rogpeppe@gmail.com>  
Rohan Challa <rohan@golang.org>  
Rohan Verma <rohanverma2004@gmail.com>  
Rohith Ravi <entombedvirus@gmail.com>  
Roland Illig <roland.illig@gmx.de>  
Roland Shoemaker <rolandshoemaker@gmail.com>  
Romain Bague <romain.bague@elwinar.com>  
Roman Budnikov <romanyx90@yandex.ru>  
Roman Kollr <roman.kollar.0@gmail.com>  
Roman Shchekin <mrqtros@gmail.com>  
Ron Hashimoto <mail@h2so5.net>  
Ron Minnich <rminnich@gmail.com>  
Ronnie Ebrin <ebrin.ronnie@protonmail.com>  
Ross Chater <rdchater@gmail.com>  
Ross Kinsey <rossikinsey@gmail.com>  
Ross Light <light@google.com> <rlight2@gmail.com>  
Ross Smith II <ross@smithii.com>  
Rowan Marshall <rowanajmarshall@gmail.com>  
Rowan Worth <sqweek@gmail.com>  
Rudi Kramer <rudi.kramer@gmail.com>  
Rui Ueyama <ruiui@google.com>  
Ruixin Bao <ruixin.bao@ibm.com>  
Ruslan Andreev <ruslan.andreev@huawei.com>  
Ruslan Nigmatullin <elessar@dropbox.com>  
Russ Cox <rsc@golang.org>  
Russell Haering <russellhaering@gmail.com>  
Ryan Bagwell <ryanbagwell@outlook.com>  
Ryan Barrett <ryanb@google.com>  
Ryan Boehning <ryan.boehning@apcera.com>  
Ryan Brown <ribrd@b@gmail.com>  
Ryan Canty <jrcanty@gmail.com>  
Ryan Dahl <ry@tinyclouds.org>  
Ryan Hitchman <hitchmanr@gmail.com>  
Ryan Kohler <ryankohler@google.com>  
Ryan Lower <rpjlower@gmail.com>  
Ryan Roden-Corrent <ryan@rcorre.net>  
Ryan Seys <ryan@ryanseys.com>  
Ryan Slade <ryanslade@gmail.com>  
Ryan Zhang <ryan.zhang@docker.com>  
Ryoichi KATO <ryo1kato@gmail.com>  
Ryoya Sekino <ryoyasekino1993@gmail.com>  
Ryuji Iwata <qt.luigi@gmail.com>  
Ryuma Yoshida <ryuma.y1117@gmail.com>

Ryuzo Yamamoto <ryuzo.yamamoto@gmail.com>  
S.alar Onur <caglar@10ur.org>  
Sabin Mihai Rapan <sabin.rapan@gmail.com>  
Sad Pencil <qh06@qq.com>  
Sai Cheemalapati <saicheems@google.com>  
Sai Kiran Dasika <kirandasika30@gmail.com>  
Sakeven Jiang <jc5930@sina.cn>  
Salaheddin M. Mahmud <salah.mahmud@gmail.com>  
Salmn Aljammz <s@0x65.net>  
Sam Arnold <sarnold64@bloomberg.net>  
Sam Boyer <tech@samboyer.org>  
Sam Chen <chenxsan@gmail.com>  
Sam Cross <samgcdev@gmail.com>  
Sam Ding <samding@ca.ibm.com>  
Sam Hug <samuel.b.hug@gmail.com>  
Sam Thorogood <thorogood@google.com> <sam.thorogood@gmail.com>  
Sam Whited <sam@samwhited.com>  
Sam Xie <xsambundy@gmail.com>  
Sameer Ajmani <sameer@golang.org> <ajmani@gmail.com>  
Sami Commerot <samic@google.com>  
Sami Pnknen <sami.ponkanen@gmail.com>  
Samuel Kelemen <SCKelemen@users.noreply.github.com>  
Samuel Tan <samueltan@google.com>  
Samuele Pedroni <pedronis@lucediaruna.net>  
Sander van Harmelen <sander@vanharmelen.nl>  
Sanjay Menakuru <balasanjay@gmail.com>  
Santhosh Kumar Tekuri <santhosh.tekuri@gmail.com>  
Santiago De la Cruz <51337247+xhit@users.noreply.github.com>  
Sarah Adams <shadams@google.com>  
Sardorbek Pulatov <sardorbek.pulatov@outlook.com>  
Sascha Brawer <sascha@brawer.ch>  
Sasha Lionheart <lionhearts@google.com>  
Sasha Sobol <sasha@scaledinference.com>  
Satoru Kitaguchi <rule.the.fate.myfirststory@gmail.com>  
Scott Barron <scott.barron@github.com>  
Scott Bell <scott@sctsm.com>  
Scott Cotton <scott@mindowl.com>  
Scott Crunkleton <crunk1@gmail.com>  
Scott Ferguson <scottwferg@gmail.com>  
Scott Lawrence <bytbox@gmail.com>  
Scott Mansfield <smansfield@netflix.com>  
Scott Ragan <ragansa@fb.com>  
Scott Schwartz <scotts@golang.org>  
Scott Van Woudenberg <scottvw@google.com>  
Sean Burford <sburford@google.com>  
Sean Chen <oohcode@gmail.com>  
Sean Chittenden <seanc@joyent.com>  
Sean Christopherson <sean.j.christopherson@intel.com>

Sean Dolphin <Sean.Dolphin@kpcompass.com>  
Sean Harger <sharger@google.com>  
Sean Harrington <sean.harrington@leftfieldlabs.com>  
Sean Hildebrand <seanwildebrand@gmail.com>  
Sean Liao <seankhiao@gmail.com>  
Sean Rees <sean@erifax.org>  
Sebastiaan van Stijn <github@gone.nl>  
Sebastian Chlopecki <sebsebmc@gmail.com>  
Sebastian Kinne <skinne@google.com>  
Sebastian Schmidt <yath@google.com>  
Sebastien Binet <seb.binet@gmail.com>  
Sbastien Paolacci <sebastien.paolacci@gmail.com>  
Sebastien Williams-Wynn <sebastien@cytora.com>  
Segev Finer <segev208@gmail.com>  
Seiji Takahashi <timaki.st@gmail.com>  
Sergei Lemeshkin <sergeilem@gmail.com>  
Sergei Skorobogatov <skorobo@rambler.ru>  
Sergei Zagurskii <gvozdoder@gmail.com>  
Sergey 'SnakE' Gromov <snake.scaly@gmail.com>  
Sergey Arseev <sergey.arseev@intel.com>  
Sergey Dobrodey <sergey.dobrodey@synesis.ru>  
Sergey Frolov <sfrolov@google.com>  
Sergey Glushchenko <gs serge@gmail.com>  
Sergey Ivanov <ser1325@gmail.com>  
Sergey Kacheev <S.Kacheev@gmail.com>  
Sergey Lukjanov <me@slukjanov.name>  
Sergey Mishin <sergeymishine@gmail.com>  
Sergey Mudrik <sergey.mudrik@gmail.com>  
Sergey Semin <gray12511@gmail.com>  
Sergey Yanykin <syanykin@ozon.ru>  
Sergio Luis O. B. Correia <sergio@correia.cc>  
Sergiusz Bazanski <bazanski@gmail.com>  
Serhat Giydiren <serhatgiydiren@gmail.com>  
Serhii Aheienko <serhii.aheienko@gmail.com>  
Seth Hoenig <seth.a.hoenig@gmail.com>  
Seth Vargo <sethvargo@gmail.com>  
Shaba Abhiram <shabarivas.abhiram@gmail.com>  
Shahar Kohanim <skohanim@gmail.com>  
Shailesh Suryawanshi <ss.shailesh28@gmail.com>  
Shamil Garatuev <garatuev@gmail.com>  
Shane Hansen <shanemhansen@gmail.com>  
Shang Jian Ding <sding3@ncsu.edu>  
Shaozhen Ding <dsz0111@gmail.com>  
Shaquille Que <shaquille@golang.org>  
Shaquille Wyan Que <shaqywyuan@gmail.com>  
Shaun Dunning <shaun.dunning@uservoice.com>  
Shawn Elliott <sellott@microsoft.com>  
Shawn Ledbetter <sledbetter@google.com>

Shawn Smith <shawn.p.smith@gmail.com>  
Shawn Walker-Salas <shawn.walker@oracle.com>  
Shenghou Ma <minux@golang.org> <minux.ma@gmail.com>  
Shengjing Zhu <zs950618@gmail.com>  
Shengyu Zhang <shengyu.zhang@chaitin.com>  
Shi Han Ng <shihanng@gmail.com>  
ShihCheng Tu <mrtoastcheng@gmail.com>  
Shijie Hao <haormj@gmail.com>  
Shin Fan <shinfan@google.com>  
Shinji Tanaka <shinji.tanaka@gmail.com>  
Shinnosuke Sawada <6warashi9@gmail.com>  
Shintaro Kaneko <kaneshin0120@gmail.com>  
Shivakumar GN <shivakumar.gn@gmail.com>  
Shivani Singhal <shivani.singhal2804@gmail.com>  
Shivansh Rai <shivansh@freebsd.org>  
Shivashis Padhi <shivashispadhi@gmail.com>  
Shoshin Nikita <shoshin\_nikita@fastmail.com>  
Shota Sugiura <s.shota.710.3506@gmail.com>  
Shubham Sharma <shubham.sha12@gmail.com>  
Shuhei Takahashi <nya@chromium.org>  
Shun Fan <sfan@google.com>  
Silvan Jegen <s.jegen@gmail.com>  
Simo Gomes Viana <simaogmv@gmail.com>  
Simarpreet Singh <simar@linux.com>  
Simon Drake <simondrake1990@gmail.com>  
Simon Ferquel <simon.ferquel@docker.com>  
Simon Frei <freisim93@gmail.com>  
Simon Jefford <simon.jefford@gmail.com>  
Simon Rawet <simon@rawet.se>  
Simon Rozman <simon@rozman.si>  
Simon Ser <contact@emersion.fr>  
Simon Thulbourn <simon+github@thulbourn.com>  
Simon Whitehead <chemnova@gmail.com>  
Sina Siadat <siadat@gmail.com>  
Sjoerd Siebinga <sjoerd.siebinga@gmail.com>  
Sokolov Yura <funny.falcon@gmail.com>  
Song Gao <song@gao.io>  
Song Lim <songlim327@gmail.com>  
Songjiayang <songjiayang1@gmail.com>  
Songlin Jiang <hollowman@hollowman.ml>  
Soojin Nam <jsunam@gmail.com>  
Sren L. Hansen <soren@linux2go.dk>  
Sparrow Li <liyuanclx@gmail.com>  
Spencer Kocot <spencerkocot@gmail.com>  
Spencer Nelson <s@spenczar.com>  
Spencer Tung <spencertung@google.com>  
Spenser Black <spenserblack01@gmail.com>  
Spring Mc <heresy.mc@gmail.com>

Srdjan Petrovic <spetrovic@google.com>  
Sridhar Venkatakrishnan <sridhar@laddoo.net>  
Srinidhi Kaushik <shrinidhi.kaushik@gmail.com>  
StalkR <stalkr@stalkr.net>  
Stan Hu <stanhu@gmail.com>  
Stan Schwertly <stan@schwertly.com>  
Stanislav Afanasev <php.progger@gmail.com>  
Steeve Morin <steeve.morin@gmail.com>  
Stefan Baebler <sbaebler@outbrain.com>  
Stefan Nilsson <snilsson@nada.kth.se> <trolleriprofessorn@gmail.com>  
Stepan Shabalin <neverliberty@gmail.com>  
Stephan Klatt <stephan.klatt@gmail.com>  
Stephan Rénatus <srenatus@chef.io>  
Stephan Zuercher <zuercher@gmail.com>  
Stéphane Travostino <stephane.travostino@gmail.com>  
Stephen Lewis <stephen@sock.org.uk>  
Stephen Lu <steuhs@users.noreply.github.com>  
Stephen Ma <stephenm@golang.org>  
Stephen McQuay <stephen@mcquay.me>  
Stephen Searles <stephens2424@gmail.com>  
Stephen Weinberg <stephen@q5comm.com>  
Steve Francia <spf@golang.org>  
Steve Gilbert <stevegilbert23@gmail.com>  
Steve LoFurno <slofurno@gmail.com>  
Steve McCoy <mccoyst@gmail.com>  
Steve Mynott <steve.mynott@gmail.com>  
Steve Newman <snewman@google.com>  
Steve Phillips <elimistev@gmail.com>  
Steve Streeting <steve@stevestreeting.com>  
Steve Traut <straut@google.com>  
Steven Buss <sbuss@google.com>  
Steven Elliot Harris <seharris@gmail.com>  
Steven Erenst <stevenerenst@gmail.com>  
Steven Hartland <steven.hartland@multiplay.co.uk>  
Steven Littlebrant <imgroxx@gmail.com>  
Steven Maude <git@stevenmaude.co.uk>  
Steven Wilkin <stevenwilkin@gmail.com>  
Stuart Jansen <sjansen@buscaluz.org>  
Subham Sarkar <sarkar.subhams2@gmail.com>  
Sue Spence <virtuallysue@gmail.com>  
Sugu Sougoumarane <ssougou@gmail.com>  
Suharsh Sivakumar <suharshs@google.com>  
Sukrit Handa <sukrit.handa@utoronto.ca>  
Sunny <me@darkowlz.space>  
Suriyaa Sundararuban <suriyaasundararuban@gmail.com>  
Suyash <dextrous93@gmail.com>  
Suzy Mueller <suzmue@golang.org>  
Sven Almgren <sven@tras.se>

Sven Blumenstein <svbl@google.com>  
Sven Lee <lee1300394324@gmail.com>  
Sven Taute <sven.taute@gmail.com>  
Sylvain Zimmer <sylvain@sylvainzimmer.com>  
Syohei YOSHIDA <syohex@gmail.com>  
Szabolcs Nagy <nsz@port70.net>  
Taavi Kivisik <taavi.kivisik@gmail.com>  
Tad Fisher <tadfisher@gmail.com>  
Tad Glines <tad.glines@gmail.com>  
Tadas Valiukas <tadovas@gmail.com>  
Tadeo Kondrak <me@tadeo.ca>  
Taesu Pyo <pyotaesu@gmail.com>  
Tai Le <letientai299@gmail.com>  
Taj Khattrra <taj.khattrra@gmail.com>  
Takashi Matsuo <tmatsuo@google.com>  
Takashi Mima <tkm1205@gmail.com>  
Takayoshi Nishida <takayoshi.nishida@gmail.com>  
Takeshi YAMANASHI <9.nashi@gmail.com>  
Takuto Ikuta <tikuta@google.com>  
Takuya Ueda <uedatakuya@gmail.com>  
Tal Shprecher <tshprecher@gmail.com>  
Tams Gulcsi <tgulacsi78@gmail.com>  
Tamir Duberstein <tamird@gmail.com>  
Tao Qingyun <qingyunha@gmail.com>  
Tao Shen <shentaoskyking@gmail.com>  
Tao Wang <twang2218@gmail.com>  
Tarmigan Casebolt <tarmigan@gmail.com>  
Taro Aoki <aizu.s1230022@gmail.com>  
Taru Karttunen <taruti@taruti.net>  
Tatsuhiko Tsujikawa <tatsuhiko.t@gmail.com>  
Tatsuya Kaneko <m.ddot.f@gmail.com>  
Taufiq Rahman <taufiqrx8@gmail.com>  
Teague Cole <tnc1443@gmail.com>  
Ted Kornish <golang@tedkornish.com>  
Tejasvi Nareddy <tejunareddy@gmail.com>  
Terin Stock <terinjokes@gmail.com>  
Terrel Shumway <gopher@shumway.us>  
Tetsuo Kiso <tetsuokiso9@gmail.com>  
Than McIntosh <thanm@google.com>  
Thanabodee Charoenpiriyakij <wingyminus@gmail.com>  
Thanatat Tamtan <acoshift@gmail.com>  
The Hatsune Daishi <nao20010128@gmail.com>  
Thiago Avelino <t@avelino.xxx>  
Thiago Fransosi Farina <thiago.farina@gmail.com> <tfarina@chromium.org>  
Thom Wiggers <thom@thomwiggers.nl>  
Thomas Alan Copeland <talan.copeland@gmail.com>  
Thomas Bonfort <thomas.bonfort@gmail.com>  
Thomas Bouldin <inlined@google.com>

Thomas Bruyelle <thomas.bruyelle@gmail.com>  
Thomas Bushnell, BSG <tbushnell@google.com>  
Thomas de Zeeuw <thomasdezeeuw@gmail.com>  
Thomas Desrosiers <thomasdesr@gmail.com>  
Thomas Habets <habets@google.com>  
Thomas Kappler <tkappler@gmail.com>  
Thomas Meson <zllak@hycik.org>  
Thomas Symborski <thomas.symborski@gmail.com>  
Thomas Wanielista <tomwans@gmail.com>  
Thorben Krueger <thorben.krueger@gmail.com>  
Thordur Bjornsson <thorduri@secnorth.net>  
Tiago Queiroz <contato@tiago.eti.br>  
Tianji Wu <the729@gmail.com>  
Tianon Gravi <admwiggin@gmail.com>  
Tilman Dilo <tilman.dilo@gmail.com>  
Tim Cooijmans <timcooijmans@gmail.com>  
Tim Cooper <tim.cooper@layeh.com>  
Tim Ebringer <tim.ebringer@gmail.com>  
Tim Heckman <t@heckman.io>  
Tim Henderson <tim.tadh@gmail.com>  
Tim Hockin <thockin@google.com>  
Tim King <taking@google.com>  
Tim Mhlmann <muhlemmer@gmail.com>  
Tim Swast <swast@google.com>  
Tim Wright <tenortim@gmail.com>  
Tim Xu <xiaoxubei@gmail.com>  
Timmy Douglas <timmyd983@gmail.com>  
Timo Savola <timo.savola@gmail.com>  
Timo Truyts <alkaloid.btx@gmail.com>  
Timothy Gu <timothygu99@gmail.com>  
Timothy Studd <tim@timstudd.com>  
Tipp Moseley <tipp@google.com>  
Tiwei Bie <tiwei.btw@antgroup.com>  
Tobias Assarsson <tobias.assarsson@gmail.com>  
Tobias Columbus <tobias.columbus@gmail.com> <tobias.columbus@googlemail.com>  
Tobias Klauser <tklauser@distanz.ch>  
Tobias Kohlbau <tobias@kohlbau.de>  
Toby Burrell <kurin@google.com>  
Todd Kulesza <tkulesza@google.com>  
Todd Neal <todd@tneal.org>  
Todd Wang <toddwang@gmail.com>  
Tom Anthony <git@tomanthony.co.uk>  
Tom Bergan <tombergan@google.com>  
Tom Freudenberg <tom.freudenberg@4commerce.de>  
Tom Heng <zhm20070928@gmail.com>  
Tom Lanyon <tomlanyon@google.com>  
Tom Levy <tomlevy93@gmail.com>  
Tom Limoncelli <tal@whatexit.org>

Tom Linfoord <tomlinfoord@gmail.com>  
Tom Panton <tom@tomandtally.co.uk>  
Tom Parkin <tom.parkin@gmail.com>  
Tom Payne <twpayne@gmail.com>  
Tom Szymanski <tgs@google.com>  
Tom Thorogood <me+google@tomthorogood.co.uk>  
Tom Wilkie <tom@weave.works>  
Tom Zierbock <tomzierbock@gmail.com>  
Tomas Dabasinskas <tomas@dabasinskas.net>  
Tommy Schaefer <tommy.schaefer@teecom.com>  
Tomohiro Kusumoto <zabio1192@gmail.com>  
Tomoya Ishizaki <zaq1tomo@gmail.com>  
Tonis Tiigi <tonistiigi@gmail.com>  
Tony Reix <tony.reix@bull.net>  
Tony Walker <walkert.uk@gmail.com>  
Tooru Takahashi <tooru.takahashi134@gmail.com>  
Tor Andersson <tor.andersson@gmail.com>  
Torben Schinke <torben.schinke@neotos.de>  
Tormod Erevik Lea <tormodlea@gmail.com>  
Toshihiro Shiino <shiino.toshihiro@gmail.com>  
Toshiki Shima <hayabusa1419@gmail.com>  
Totoro W <tw19881113@gmail.com>  
Travis Bischel <travis.bischel@gmail.com>  
Travis Cline <travis.cline@gmail.com>  
Trevor Dixon <trevordixon@gmail.com>  
Trevor Strohman <trevor.strohman@gmail.com>  
Trey Lawrence <lawrence.trey@gmail.com>  
Trey Roessig <trey.roessig@gmail.com>  
Trey Tacon <ttacon@gmail.com>  
Tristan Amini <tamini01@ca.ibm.com>  
Tristan Colgate <tcolgate@gmail.com>  
Tristan Oohry <oohry@gmail.com>  
Tristan Rice <rice@fn.lc>  
Troels Thomsen <troels@thomsen.io>  
Trong Bui <trong.buiquoc@gmail.com>  
Trung Nguyen <trung.n.k@gmail.com>  
Tsuji Daishiro <dram.dt.shonan@gmail.com>  
Tudor Golubenco <tudor.g@gmail.com>  
Tugdual Saunier <tugdual.saunier@gmail.com>  
Tuo Shan <sturbo89@gmail.com> <shantuo@google.com>  
Tyler Bui-Palsulich <tpalsulich@google.com>  
Tyler Bunnell <tylerbunnell@gmail.com>  
Tyler Treat <ttreat31@gmail.com>  
Tyson Andre <tysonandre775@gmail.com>  
Tzach Shabtay <tzachshabtay@gmail.com>  
Tzu-Chiao Yeh <su3g4284zo6y7@gmail.com>  
Tzu-Jung Lee <roylee17@currant.com>  
Udalov Max <re.udalov@gmail.com>

Uddeshya Singh <singhuddeshyaofficial@gmail.com>  
Ugorji Nwoke <ugorji@gmail.com>  
Ulf Holm Nielsen <doktor@dyregod.dk>  
Ulrich Kunitz <uli.kunitz@gmail.com>  
Umang Parmar <umangjparmar@gmail.com>  
Uriel Mangado <uriel@berlinblue.org>  
Urvil Patel <patelurvil38@gmail.com>  
Utkarsh Dixit <53217283+utkarsh-extc@users.noreply.github.com>  
Uttam C Pawar <uttam.c.pawar@intel.com>  
Vadim Grek <vadimprog@gmail.com>  
Vadim Vygonets <unixdj@gmail.com>  
Val Polouchkine <vpolouch@justin.tv>  
Valentin Vidic <vvidic@valentin-vidic.from.hr>  
Vaughn Iverson <vsivsi@yahoo.com>  
Vee Zhang <veezhang@126.com> <vveezhang@gmail.com>  
Vega Garcia Luis Alfonso <vegacom@gmail.com>  
Venil Noronha <veniln@vmware.com>  
Veselkov Konstantin <kostozyb@gmail.com>  
Viacheslav Poturaev <vearutop@gmail.com>  
Victor Chudnovsky <vchudnov@google.com>  
Victor Michel <victor@optimize.cloud>  
Victor Vrantchan <vrancean+github@gmail.com>  
Vignesh Ramachandra <vickyramachandra@gmail.com>  
Vikas Kedia <vikask@google.com>  
Ville Skytt <ville.skytta@iki.fi>  
Vincent Ambo <tazjin@googlemail.com>  
Vincent Batts <vbatts@hashbangbash.com> <vbatts@gmail.com>  
Vincent Vanackere <vincent.vanackere@gmail.com>  
Vinu Rajashekhar <vinutheraj@gmail.com>  
Vish Subramanian <vish@google.com>  
Vishal Dalwadi <dalwadivishal26@gmail.com>  
Vishvananda Ishaya <vishvananda@gmail.com>  
Visweswara R <r.visweswara@gmail.com>  
Vitaly Zdanevich <zdanevich.vitaly@ya.ru>  
Vitor De Mario <vitordemario@gmail.com>  
Vivek Sekhar <vsekhar@google.com>  
Vivek V <iamvivekv96@gmail.com>  
Vivian Liang <vliang88@gmail.com>  
Vlad Krasnov <vlad@cloudflare.com>  
Vladimir Evgrafov <evgrafov.vladimir@gmail.com>  
Vladimir Kovpak <cn007b@gmail.com>  
Vladimir Kuzmin <vkuzmin@uber.com>  
Vladimir Mihailenco <vladimir.webdev@gmail.com>  
Vladimir Nikishenko <vova616@gmail.com>  
Vladimir Stefanovic <vladimir.stefanovic@imgtec.com>  
Vladimir Varankin <nek.narqo@gmail.com>  
Vojtech Bocek <vbocek@gmail.com>  
Volker Dobler <dr.volker.dobler@gmail.com>

Volodymyr Paprotski <vpaprots@ca.ibm.com>  
W. Trevor King <wking@tremily.us>  
Wade Simmons <wade@wades.im>  
Wagner Riffel <wgriffel@gmail.com>  
Walt Della <walt@javins.net>  
Walter Poupore <wpoupore@google.com>  
Wander Lairson Costa <wcosta@mozilla.com>  
Wang Xuerui <git@xen0n.name>  
Warren Fernandes <warren.f.fernandes@gmail.com>  
Wayne Ashley Berry <wayneashleyberry@gmail.com>  
Wedson Almeida Filho <wedsonaf@google.com>  
Weerasak Chongnguluam <singpor@gmail.com>  
Wi Cngru <crvv.mail@gmail.com>  
Wei Fu <fhfuwei@163.com>  
Wei Guangjing <vcc.163@gmail.com>  
Wei Xiao <wei.xiao@arm.com>  
Wei Xikai <xykwei@gmail.com>  
Weichao Tang <tevic.tt@gmail.com>  
Weixie Cui <cuiweixie@gmail.com> <523516579@qq.com>  
Wembley G. Leach, Jr <wembley.gl@gmail.com>  
Wenlei (Frank) He <wlhe@google.com>  
Wenzel Lowe <lowewenzel@gmail.com>  
Wil Selwood <wselwood@gmail.com>  
Wilfried Teiken <wteiken@google.com>  
Will Beason <willbeason@gmail.com>  
Will Chan <willchan@google.com>  
Will Faught <will.faught@gmail.com>  
Will Morrow <wmorrow.qdt@qualcommdatacenter.com>  
Will Norris <willnorris@google.com>  
Will Storey <will@summercat.com>  
Willem van der Schyff <willemvds@gmail.com>  
William Chan <willchan@chromium.org>  
William Chang <mr.williamchang@gmail.com>  
William Josephson <wjosephson@gmail.com>  
William Langford <wlangfor@gmail.com>  
William Orr <will@worrbase.com> <ay1244@gmail.com>  
William Poussier <william.poussier@gmail.com>  
Wisdom Omuya <deafgoat@gmail.com>  
Wu Yunzhou <yunzhouwu@gmail.com>  
Xi Ruoyao <xry23333@gmail.com>  
Xia Bin <snyh@snyh.org>  
Xiangdong Ji <xiangdong.ji@arm.com>  
Xiaodong Liu <teaofmoli@gmail.com>  
Xing Gao <18340825824@163.com>  
Xing Xing <mikespook@gmail.com>  
Xingqiang Bai <bxq2011hust@qq.com>  
Xu Fei <badgangkiller@gmail.com>  
Xudong Zhang <felixmelon@gmail.com>

Xudong Zheng <7pkvm5aw@slicealias.com>  
Xuyang Kang <xuyangkang@gmail.com>  
Yamagishi Kazutoshi <ykzts@desire.sh>  
Yan Zou <yzou@google.com>  
Yang Hau <vulxj0j8j8@gmail.com>  
Yang Tian <linuxty@gmail.com>  
Yann Hodique <yhodique@google.com>  
Yann Kerherv <yann.kerherve@gmail.com>  
Yann Salan <yannsalaun1@gmail.com>  
Yannic Bonenberger <contact@yannic-bonenberger.com>  
Yao Zhang <lunaria21@gmail.com>  
Yaron de Leeuw <jarondl@google.com>  
Yaroslav Vorobiov <yar.vorobiov@gmail.com>  
Yasha Bubnov <girokompas@gmail.com>  
Yasser Abdolmaleki <yasser@yasser.ca>  
Yasuharu Goto <matope.ono@gmail.com>  
Yasuhiro Matsumoto <mattn.jp@gmail.com>  
Yasutaka Shinzaki <shinzaki@yasu26.tech>  
Yasuyuki Oka <yasuyk@gmail.com>  
Yazen Shunnar <yazen.shunnar@gmail.com>  
Yestin Sun <ylh@pdx.edu>  
Yesudeep Mangalapilly <yesudeep@google.com>  
Yissakhar Z. Beck <yissakhar.beck@gmail.com>  
Yo-An Lin <yoanlin93@gmail.com>  
Yohei Takeda <yo.tak0812@gmail.com>  
Yongjian Xu <i3dmaster@gmail.com>  
Yorman Arias <cixtords@gmail.com>  
Yoshiyuki Kanno <nekotaroh@gmail.com> <yoshiyuki.kanno@stoic.co.jp>  
Yoshiyuki Mineo <yoshiyuki.mineo@gmail.com>  
Yosuke Akatsuka <yosuke.akatsuka@gmail.com>  
Youfu Zhang <zhangyoufu@gmail.com>  
Yu Heng Zhang <annita.zhang@cn.ibm.com>  
Yu Xuan Zhang <zyxsh@cn.ibm.com>  
Yu, Li-Yu <afg984@gmail.com>  
Yuichi Kishimoto <yk2220s@gmail.com>  
Yuichi Nishiwaki <yuichi.nishiwaki@gmail.com>  
Yuji Yaginuma <yuuji.yaginuma@gmail.com>  
Yuki Ito <mrno110y@gmail.com>  
Yuki OKUSHI <huyuumi.dev@gmail.com>  
Yuki Yugui Sonoda <yugui@google.com>  
Yukihiro Nishinaka <6elpinal@gmail.com>  
YunQiang Su <syq@debian.org>  
Yury Smolsky <yury@smolsky.by>  
Yusuke Kagiwada <block.rxckin.beats@gmail.com>  
Yuusei Kuwana <kuwana@kumama.org>  
Yuval Pavel Zholkover <paulzhol@gmail.com>  
Yves Junqueira <yvesj@google.com> <yves.junqueira@gmail.com>  
Zac Bergquist <zbergquist99@gmail.com>

Zach Bintliff <zintliff@gmail.com>  
Zach Gershman <zachgersh@gmail.com>  
Zach Hoffman <zrhoffman@apache.org>  
Zach Jones <zachj1@gmail.com>  
Zachary Amsden <zach@thundertoken.com>  
Zachary Gershman <zgershman@pivotal.io>  
Zak <zrjknill@gmail.com>  
Zakatell Kanda <hi@zkanda.io>  
Zellyn Hunter <zellyn@squareup.com> <zellyn@gmail.com>  
Zev Goldstein <zev.goldstein@gmail.com>  
Zhang Boyang <zhangboyang.id@gmail.com>  
Zheng Dayu <davidzheng23@gmail.com>  
Zheng Xu <zheng.xu@arm.com>  
Zhengyu He <hzy@google.com>  
Zhongpeng Lin <zplin@uber.com>  
Zhongtao Chen <chenzhongtao@126.com>  
Zhongwei Yao <zhongwei.yao@arm.com>  
Zhou Peng <p@ctruple.cn>  
Ziad Hatahet <hatahet@gmail.com>  
Ziheng Liu <lzhfromustc@gmail.com>  
Zorion Arrizabalaga <zorionk@gmail.com>  
Zvonimir Pavlinovic <zpavlinovic@google.com>  
Zyad A. Ali <zyad.ali.me@gmail.com>  
<a.maksadbek@gmail.com>  
<max.faceless.frei@gmail.com>  
<hagen1778@gmail.com>  
<tbunyk@gmail.com>  
<faxriddinjon@gmail.com>  
<zs349596@gmail.com>  
<bronze1man@gmail.com>  
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#  
# Names should be added to this file as:  
# Name <email address>  
Raul Silvera <rsilvera@google.com>  
Tipp Moseley <tipp@google.com>  
Hyoun Kyu Cho <netforce@google.com>  
Martin Spier <spiermar@gmail.com>  
Taco de Wolff <tacodewolff@gmail.com>

Andrew Hunter <andrewhunter@gmail.com>

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```

```
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```

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```
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```

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```
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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```
/*
```

```
* Soft:   multipath device mapper target autoconfig
```

```
*
```

```
* Version: $Id: main.h,v 0.0.1 2003/09/18 15:13:38 cvaroqui Exp $
```

```
*
```

```
* Author:  Christophe Varoqui
```

```
*
```

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## 1.143 grub2 2.02-123.el8\_6.8.alma

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Alexander Artemenko  
Aymeric Augustin  
Ned Batchelder  
Wouter Bolsterlee  
Brett Cannon  
Jason R. Coombs  
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Ben Davis  
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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2)

will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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## 1.153 gmp 6.1.2 10.el8

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```
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Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
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```

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```
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```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
```

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## 1.154 pycparser 2.20

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pycparser -- A C parser in Python

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## 1.156 fdisk 2.32.1

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;\*!;\_>KfBqxY(F|0.Ve%S61opMG`YfRXvY[R+t[ BS=)d ;\*!;\_>KfBqxY(F|0.Ve%Q?

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# 1.157 coverage 5.5.0.final.0

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Coverage.py was originally written by Gareth Rees, and since 2004 has been extended and maintained by Ned Batchelder.

Other contributions, including writing code, updating docs, and submitting useful bug reports, have been made by:

Abdeali Kothari

Adi Roiban

Agbonze O. Jeremiah

Albertas Agejevas

Aleksi Torhamo

Alex Gaynor

Alex Groce

Alex Sandro

Alexander Todorov

Alexander Walters

Andrew Hoos

Anthony Sottile

Arcadiy Ivanov  
Aron Griffis  
Artem Dayneko  
Arthur Deygin  
Ben Finney  
Bernt Gbor  
Bill Hart  
Brandon Rhodes  
Brett Cannon  
Bruno P. Kinoshita  
Buck Evan  
Calen Pennington  
Carl Gieringer  
Catherine Proulx  
Chris Adams  
Chris Jerdonek  
Chris Rose  
Chris Warrick  
Christian Heimes  
Christine Lytwynec  
Christoph Zwerschke  
Conrad Ho  
Cosimo Lupo  
Dan Hemberger  
Dan Riti  
Dan Wandschneider  
Danek Duvall  
Daniel Hahler  
Danny Allen  
David Christian  
David MacIver  
David Stanek  
David Szotten  
Detlev Offenbach  
Devin Jeanpierre  
Dirk Thomas  
Dmitry Shishov  
Dmitry Trofimov  
Eduardo Schettino  
Edward Loper  
Eli Skeggs  
Emil Madsen  
eric Larivire  
Federico Bond  
Frazer McLean  
Geoff Bache  
George Paci  
George Song

George-Cristian Brzan  
Greg Rogers  
Guido van Rossum  
Guillaume Chazarain  
Hugo van Kemenade  
Ilia Meerovich  
Imri Goldberg  
Ionel Cristian Mrie  
JT Olds  
Jerin Peter George  
Jessamyn Smith  
Joe Doherty  
Joe Jevnik  
Jon Chappell  
Jon Dufresne  
Joseph Tate  
Josh Williams  
Judson Neer  
Julian Berman  
Julien Voisin  
Justas Sadzeviius  
Kjell Braden  
Krystian Kichewko  
Kyle Altendorf  
Lars Hupfeldt Nielsen  
Leonardo Pistone  
Lex Berezhny  
Loc Dachary  
Marc Abramowitz  
Marcus Cobden  
Marius Gedminas  
Mark van der Wal  
Martin Fuzzey  
Matt Bachmann  
Matthew Boehm  
Matthew Desmarais  
Max Linke  
Micha Bultrowicz  
Mickie Betz  
Mike Fiedler  
Naveen Yadav  
Nathan Land  
Noel O'Boyle  
Olivier Grisel  
Ori Avtalion  
Pankaj Pandey  
Pablo Carballo  
Patrick Mezard

Peter Baughman  
Peter Ebden  
Peter Portante  
Reya B  
Rodrigue Cloutier  
Roger Hu  
Ross Lawley  
Roy Williams  
Salvatore Zagaria  
Sandra Martocchia  
Scott Belden  
Sebastin Ramrez  
Sigve Tjora  
Simon Willison  
Stan Hu  
Stefan Behnel  
Stephan Richter  
Stephen Finucane  
Steve Leonard  
Steve Peak  
S. Y. Lee  
Teake Nutma  
Ted Wexler  
Thijs Triemstra  
Thomas Grainger  
Titus Brown  
Valentin Lab  
Vince Salvino  
Ville Skytt  
Xie Yanbo  
Yury Selivanov  
Zac Hatfield-Dodds  
Zooko Wilcox-O'Hearn

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## 1.158 urllib3 1.22

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# Contributions to the urllib3 project

## Creator & Maintainer

\* Andrey Petrov <andrey.petrov@shazow.net>

## Contributors

In chronological order:

- \* victor.vde <<http://code.google.com/u/victor.vde/>>
- \* HTTPS patch (which inspired HTTPSConnectionPool)
  
- \* erikcederstrand <<http://code.google.com/u/erikcederstrand/>>
- \* NTLM-authenticated HTTPSConnectionPool
- \* Basic-authenticated HTTPSConnectionPool (merged into make\_headers)
  
- \* niphlod <niphlod@gmail.com>
- \* Client-verified SSL certificates for HTTPSConnectionPool
- \* Response gzip and deflate encoding support
- \* Better unicode support for filepost using StringIO buffers
  
- \* btoconnor <brian@btoconnor.net>
- \* Non-multipart encoding for POST requests
  
- \* p.dobrogost <<http://code.google.com/u/@WBRSRIBZDhBFXQB6/>>
- \* Code review, PEP8 compliance, benchmark fix
  
- \* kennethreitz <me@kennethreitz.com>
- \* Bugfixes, suggestions, Requests integration
  
- \* georgemarshall <<http://github.com/georgemarshall>>
- \* Bugfixes, Improvements and Test coverage
  
- \* Thomas Kluyver <thomas@kluyver.me.uk>
- \* Python 3 support
  
- \* brandon-rhodes <<http://rhodesmill.org/brandon>>
- \* Design review, bugfixes, test coverage.
  
- \* studer <theo.studer@gmail.com>
- \* IPv6 url support and test coverage
  
- \* Shivaram Lingamneni <slingamn@cs.stanford.edu>
- \* Support for explicitly closing pooled connections
  
- \* hartator <hartator@gmail.com>
- \* Corrected multipart behavior for params
  
- \* Thomas Weischuh <thomas@t-8ch.de>
- \* Support for TLS SNI
- \* API unification of ssl\_version/cert\_reqs
- \* SSL fingerprint and alternative hostname verification
- \* Bugfixes in testsuite
  
- \* Sune Kirkeby <mig@ibofobi.dk>
- \* Optional SNI-support for Python 2 via PyOpenSSL.

- \* Marc Schlaich <marc.schlaich@gmail.com>
- \* Various bugfixes and test improvements.
  
- \* Bryce Boe <bbzbryce@gmail.com>
- \* Correct six.moves conflict
- \* Fixed pickle support of some exceptions
  
- \* Boris Figovsky <boris.figovsky@ravellosystems.com>
- \* Allowed to skip SSL hostname verification
  
- \* Cory Benfield <http://lukasa.co.uk/about/>
- \* Stream method for Response objects.
- \* Return native strings in header values.
- \* Generate 'Host' header when using proxies.
  
- \* Jason Robinson <jaywink@basshero.org>
- \* Add missing WrappedSocket.fileno method in PyOpenSSL
  
- \* Audrius Butkevicius <audrius.butkevicius@elastichosts.com>
- \* Fixed a race condition
  
- \* Stanislav Vitkovskiy <stas.vitkovsky@gmail.com>
- \* Added HTTPS (CONNECT) proxy support
  
- \* Stephen Holsapple <sholsapp@gmail.com>
- \* Added abstraction for granular control of request fields
  
- \* Martin von Gagern <Martin.vGagern@gmx.net>
- \* Support for non-ASCII header parameters
  
- \* Kevin Burke <kev@inburke.com> and Pavel Kirichenko <juanych@yandex-team.ru>
- \* Support for separate connect and request timeouts
  
- \* Peter Waller <p@pwaller.net>
- \* HTTPResponse.tell() for determining amount received over the wire
  
- \* Nipunn Koorapati <nipunn1313@gmail.com>
- \* Ignore default ports when comparing hosts for equality
  
- \* Danilo @dbrgn <http://dbrgn.ch/>
- \* Disabled TLS compression by default on Python 3.2+
- \* Disabled TLS compression in pyopenssl contrib module
- \* Configurable cipher suites in pyopenssl contrib module
  
- \* Roman Bogorodskiy <roman.bogorodskiy@ericsson.com>
- \* Account retries on proxy errors
  
- \* Nicolas Delaby <nicolas.delaby@ezeep.com>

- \* Use the platform-specific CA certificate locations
  
- \* Josh Schneier <<https://github.com/jschneier>>
  - \* HTTPHeaderDict and associated tests and docs
  - \* Bugfixes, docs, test coverage
  
- \* Tahia Khan <<http://tahia.tk/>>
  - \* Added Timeout examples in docs
  
- \* Arthur Grunseid <<http://grunseid.com>>
  - \* source\_address support and tests (with <https://github.com/bui>)
  
- \* Ian Cordasco <[graffatcolmingov@gmail.com](mailto:graffatcolmingov@gmail.com)>
  - \* PEP8 Compliance and Linting
  - \* Add ability to pass socket options to an HTTP Connection
  
- \* Erik Tollerud <[erik.tollerud@gmail.com](mailto:erik.tollerud@gmail.com)>
  - \* Support for standard library io module.
  
- \* Krishna Prasad <[kprasad.iitd@gmail.com](mailto:kprasad.iitd@gmail.com)>
  - \* Google App Engine documentation
  
- \* Aaron Meurer <[asmeurer@gmail.com](mailto:asmeurer@gmail.com)>
  - \* Added `Url.url`, which unparses a `Url`
  
- \* Evgeny Kapun <[abacabadabacaba@gmail.com](mailto:abacabadabacaba@gmail.com)>
  - \* Bugfixes
  
- \* Benjamin Meyer <[bm\\_witness@yahoo.com](mailto:bm_witness@yahoo.com)>
  - \* Security Warning Documentation update for proper capture
  
- \* Shivan Sornarajah <[github@sornars.com](mailto:github@sornars.com)>
  - \* Support for using `ConnectionPool` and `PoolManager` as context managers.
  
- \* Alex Gaynor <[alex.gaynor@gmail.com](mailto:alex.gaynor@gmail.com)>
  - \* Updates to the default SSL configuration
  
- \* Tomas Tomecek <[ttomecek@redhat.com](mailto:ttomecek@redhat.com)>
  - \* Implemented generator for getting chunks from chunked responses.
  
- \* tlynn <<https://github.com/tlynn>>
  - \* Respect the warning preferences at import.
  
- \* David D. Riddle <[ddriddle@illinois.edu](mailto:ddriddle@illinois.edu)>
  - \* IPv6 bugfixes in testsuite
  
- \* Jon Wayne Parrott <[jonwayne@google.com](mailto:jonwayne@google.com)>
  - \* App Engine environment tests.

- \* John Krauss <<https://github.com/talos>>
  - \* Clues to debugging problems with `cryptography` dependency in docs
- \* Disassem <<https://github.com/Disassem>>
  - \* Fix pool-default headers not applying for url-encoded requests like GET.
- \* James Atherfold <[jlatherfold@hotmail.com](mailto:jlatherfold@hotmail.com)>
  - \* Bugfixes relating to cleanup of connections during errors.
- \* Christian Pedersen <<https://github.com/chripede>>
  - \* IPv6 HTTPS proxy bugfix
- \* Jordan Moldow <<https://github.com/jmoldow>>
  - \* Fix low-level exceptions leaking from ``HTTPResponse.stream()``.
  - \* Bugfix for ``ConnectionPool.urlopen(release\_conn=False)``.
  - \* Creation of ``HTTPConnectionPool.ResponseCls``.
- \* Predrag Gruevski <<https://github.com/obi1kenobi>>
  - \* Made cert digest comparison use a constant-time algorithm.
- \* Adam Talsma <<https://github.com/a-tal>>
  - \* Bugfix to ca\_cert file paths.
- \* Evan Meagher <<https://evanmeagher.net>>
  - \* Bugfix related to `memoryview` usage in PyOpenSSL adapter
- \* John Vandenberg <[jayvdb@gmail.com](mailto:jayvdb@gmail.com)>
  - \* Python 2.6 fixes; pyflakes and pep8 compliance
- \* Andy Caldwell <[andy.m.caldwell@gmail.com](mailto:andy.m.caldwell@gmail.com)>
  - \* Bugfix related to reusing connections in indeterminate states.
- \* Ville Skytt <[ville.skytta@iki.fi](mailto:ville.skytta@iki.fi)>
  - \* Logging efficiency improvements, spelling fixes, Travis config.
- \* Shige Takeda <[smtakeda@gmail.com](mailto:smtakeda@gmail.com)>
  - \* Started Recipes documentation and added a recipe about handling concatenated gzip data in HTTP response
- \* Jesse Shapiro <[jesse@jesseshapiro.net](mailto:jesse@jesseshapiro.net)>
  - \* Various character-encoding fixes/tweaks
  - \* Disabling IPv6 DNS when IPv6 connections not supported
- \* David Foster <<http://dafoster.net/>>
  - \* Ensure order of request and response headers are preserved.
- \* Jeremy Cline <[jeremy@jcline.org](mailto:jeremy@jcline.org)>
  - \* Added connection pool keys by scheme

- \* Aviv Palivoda <palaviv@gmail.com>
  - \* History list to Retry object.
  - \* HTTPResponse contains the last Retry object.
  
  - \* Nate Prewitt <nate.prewitt@gmail.com>
  - \* Ensure timeouts are not booleans and greater than zero.
  - \* Fixed infinite loop in ``stream`` when amt=None.
  - \* Added length\_remaining to determine remaining data to be read.
  - \* Added enforce\_content\_length to raise exception when incorrect content-length received.
  
  - \* Seth Michael Larson <sethmichaellarson@protonmail.com>
  - \* Created selectors backport that supports PEP 475.
  
  - \* Alexandre Dias <alex.dias@smarkets.com>
  - \* Don't retry on timeout if method not in whitelist
  
  - \* Moinuddin Quadri <moin18@gmail.com>
  - \* Lazily load idna package
  
  - \* Tom White <s6yg1ez3@mail2tor.com>
  - \* Made SOCKS handler differentiate socks5h from socks5 and socks4a from socks4.
  
  - \* Tim Burke <tim.burke@gmail.com>
  - \* Stop buffering entire deflate-encoded responses.
  
  - \* Tuukka Mustonen <tuukka.mustonen@gmail.com>
  - \* Add counter for status\_forcelist retries.
  
  - \* Erik Rose <erik@mozilla.com>
  - \* Bugfix to pyopenssl vendoring
  
  - \* [Your name or handle] <[email or website]>
  - \* [Brief summary of your changes]
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## 1.160 libtirpc 1.1.4-6.el8

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## 1.161 py-radius 0.0.4

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## 1.163 aiohttp-cors 0.7.0

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Upstream-Name: liblz4

Upstream-Contact: Yann Collet <[Cyan4973@github.com](mailto:Cyan4973@github.com)>

Source: <https://github.com/lz4/lz4>

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## 1.169 docker-py 5.0.3

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## 1.170 ncurses 6.1-9.20180224.el8

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## 1.171 idna 3.3

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## 1.172 simplepam 0.1.5

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Metadata-Version: 1.0

Name: simplepam

Version: 0.1.5

Summary: An interface to the Pluggable Authentication Modules (PAM) library on linux, written in pure python (using ctypes)

Home-page: <https://github.com/leonnnn/python3-simplepam>

Author: Leon Weber <[leon@leonweber.de](mailto:leon@leonweber.de)>, Chris AtLee <[chris@atlee.ca](mailto:chris@atlee.ca)>

Author-email: [leon@leonweber.de](mailto:leon@leonweber.de)

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# 1.173 hardlink 1.3 6.el8

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## 1.174 cryptsetup 2.3.7-2.el8

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# 1.178 coverage 5.5

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## 1.179 p11-kit 0.23.22-1.e18

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# 1.185 tar 1.30 5.el8

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```
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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
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(This file is under construction.) -\*- text -\*-

If you've contributed to gas and your name isn't listed here, it is

not meant as a slight. I just don't know about it. Email me,  
nickc@redhat.com and I'll correct the situation.

This file will eventually be deleted: The general info will go into  
the documentation, and info on specific files will go into an AUTHORS  
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+++++

Dean Elsner wrote the original gas for vax. [more details?]

Jay Fenlason maintained gas for a while, adding support for  
gdb-specific debug information and the 68k series machines, most of  
the preprocessing pass, and extensive changes in messages.c,  
input-file.c, write.c.

K. Richard Pixley maintained gas for a while, adding various  
enhancements and many bug fixes, including merging support for several  
processors, breaking gas up to handle multiple object file format  
backends (including heavy rewrite, testing, an integration of the coff  
and b.out backends), adding configuration including heavy testing and  
verification of cross assemblers and file splits and renaming,  
converted gas to strictly ansi C including full prototypes, added  
support for m680[34]0 & cpu32, considerable work on i960 including a  
coff port (including considerable amounts of reverse engineering), a  
sparc opcode file rewrite, decstation, rs6000, and hp300hpux host  
ports, updated "know" assertions and made them work, much other  
reorganization, cleanup, and lint.

Ken Raeburn wrote the high-level BFD interface code to replace most of  
the code in format-specific I/O modules.

The original Vax-VMS support was contributed by David L. Kashtan.  
Eric Youngdale and Pat Rankin have done much work with it since.

The Intel 80386 machine description was written by Eliot Dresselhaus.

Minh Tran-Le at IntelliCorp contributed some AIX 386 support.

The Motorola 88k machine description was contributed by Devon Bowen of  
Buffalo University and Torbjorn Granlund of the Swedish Institute of  
Computer Science.

Keith Knowles at the Open Software Foundation wrote the original MIPS  
back end (tc-mips.c, tc-mips.h), and contributed Rose format support  
that hasn't been merged in yet. Ralph Campbell worked with the MIPS  
code to support a.out format.

Support for the Zilog Z8k and Hitachi H8/300, H8/500 and SH processors (tc-z8k, tc-h8300, tc-h8500, tc-sh), and IEEE 695 object file format (obj-ieee), was written by Steve Chamberlain of Cygnus Solutions. Steve also modified the COFF back end (obj-coffbfd) to use BFD for some low-level operations, for use with the Hitachi, 29k and Zilog targets.

John Gilmore built the AMD 29000 support, added .include support, and simplified the configuration of which versions accept which pseudo-ops. He updated the 68k machine description so that Motorola's opcodes always produced fixed-size instructions (e.g. jsr), while synthetic instructions remained shrinkable (jbsr). John fixed many bugs, including true tested cross-compilation support, and one bug in relaxation that took a week and required the proverbial one-bit fix.

Ian Lance Taylor of Cygnus Solutions merged the Motorola and MIT syntaxes for the 68k, completed support for some COFF targets (68k, i386 SVR3, and SCO Unix), wrote the ECOFF support based on Michael Meissner's mips-tfile program, wrote the PowerPC and RS/6000 support, and made a few other minor patches. He handled the binutils releases for versions 2.7 through 2.9.

David Edelsohn contributed fixes for the PowerPC and AIX support.

Steve Chamberlain made gas able to generate listings.

Support for the HP9000/300 was contributed by Glenn Engel of HP.

Support for ELF format files has been worked on by Mark Eichin of Cygnus Solutions (original, incomplete implementation), Pete Hoogenboom at the University of Utah (HPPA mainly), Michael Meissner of the Open Software Foundation (i386 mainly), and Ken Raeburn of Cygnus Solutions (sparc, initial 64-bit support).

Several engineers at Cygnus Solutions have also provided many small bug fixes and configuration enhancements.

The initial Alpha support was contributed by Carnegie-Mellon University. Additional work was done by Ken Raeburn of Cygnus Solutions. Richard Henderson then rewrote much of the Alpha support.

Ian Dall updated the support code for the National Semiconductor 32000 series, and added support for Mach 3 and NetBSD running on the PC532.

Klaus Kaempf ported the assembler and the binutils to openVMS/Alpha.

Steve Haworth contributed the support for the Texas Instruction c30 (tms320c30).

H.J. Lu has contributed many patches and much testing.

Alan Modra reworked much of the i386 backend, improving the error checking, updating the code, and improving the 16 bit support, using patches from the work of Martynas Kunigelis and H.J. Lu.

Many others have contributed large or small bugfixes and enhancements. If you've contributed significant work and are not mentioned on this list, and want to be, let us know. Some of the history has been lost; we aren't intentionally leaving anyone out.

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school, if any, to sign a "copyright disclaimer" for the library, if  
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library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

## 1.187 openssl 1.1.1k-6.el8\_5

### 1.187.1 Available under license :

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en" dir="ltr">
<head>
<title>PostgreSQL JDBC License</title>
<meta http-equiv="Content-Type" content="text/xhtml; charset=utf-8" />
<meta name="description" content="The official site for the PostgreSQL JDBC Driver" />
<meta name="copyright" content="The PostgreSQL Global Development Group" />

<style type="text/css" media="screen" title="Normal Text">@import url("../media/css/base.css");</style>

<link rel="shortcut icon" href="../media/favicon.ico" />

<!--
<script type="text/javascript">
var _gaq = _gaq || [];
_gaq.push(['_setAccount', 'UA-1345454-1']);
_gaq.push(['_trackPageview']);
(function() {
var ga = document.createElement('script'); ga.type = 'text/javascript'; ga.async = true;
ga.src = ('https:' == document.location.protocol ? 'https://ssl' : 'http://www') + '.google-analytics.com/ga.js';
var s = document.getElementsByTagName('script')[0]; s.parentNode.insertBefore(ga, s);
})();
</script>
-->
</head>
```

```

<body>
<div id="pgContainerWrap">
  <div id="pgContainer">

    <span class="txtOffScreen"><a href="#pgContent" title="Skip site navigation" accesskey="1">Skip site
navigation</a> (1)</span>
    <span class="txtOffScreen"><a href="#pgContentWrap" title="Skip section navigation" accesskey="2">Skip
section navigation</a> (2)</span>

  <div id="pgHeaderContainer">

    <div id="pgSearch">

      <!-- Old pgjdbc form -->
      <form action="https://www.google.com/search" method="get">
        <input value="jdbc.postgresql.org" name="sitesearch" type="hidden" />
        <input id="q" name="q" type="text" size="20" maxlength="255" onfocus="if( this.value==this.defaultValue
this.value=";" value="Google Search" accesskey="s" />
        <!-- <input onFocus="getBlank (this, 'Search the site with google');" size="25" name="q" id="query" type="text"
value="Search the site with google">&nbsp;   -->
          <input name="Search" value="Search" type="submit" />
        </form>

      <!-- New PostgreSQL form
      <form method="get" action="search/">
        <div>
          <h2 class="pgBlockHide"><label for="q">Search</label></h2>
          <input id="q" name="q" type="text" size="20" maxlength="255" onfocus="if( this.value==this.defaultValue
this.value=";" value="Search" accesskey="s" />
          <input name="a" type="hidden" value="1"/>
          <input id="submit" name="submit" type="submit" value="Search" />
        </div>
      </form>
      -->

    </div> <!-- pgSearch -->
    <br />

    <div id="pgHeader">
      <div id="pgHeaderLogoLeft">
        
        <map name="maplinks">
          <area shape="rect" coords="0,0,231,80" alt="PostgreSQL" href="https://postgresql.org" />
          <area shape="rect" coords="232,0,390,80" alt="PostgreSQL JDBC Driver" href="https://jdbc.postgresql.org" />
        </map>
      </div>
      <div id="pgHeaderLogoRight">
        <a href="https://postgresql.org">

```

```
    
  </a>
</div>
</div> <!-- pgHeader -->
```

```
<div id="pgTopNav">
  <div id="pgTopNavLeft">
    
  </div>
  <div id="pgTopNavRight">
    
  </div>
  <ul id="pgTopNavList">
    <li><a href="../index.html" title="Home">Home</a></li>
    <li><a href="../about/about.html" title="About">About</a></li>
    <li><a href="../download.html" title="Download">Download</a></li>
    <li><a href="../documentation/documentation.html" title="Documentation">Documentation</a></li>
    <li><a href="../community/community.html" title="Community">Community</a></li>
    <li><a href="../development/development.html" title="Development">Development</a></li>
  </ul>
</div> <!-- pgTopNav -->
</div> <!-- pgHeaderContainer -->
```

```
<div id="pgContent">
  <div id="pgSideWrap">
    <div id="pgSideNav">
      <ul>
        <li><a href="about.html">About</a></li>
        <li><a href="license.html">License</a></li>
        <li><a href="extras.html">Extras</a></li>
      </ul>
    </div> <!-- pgSideNav -->
  </div> <!-- pgSideWrap -->
```

```
<div id="pgContentWrap">
  <h1>BSD 2-clause "Simplified" License</h1>
  <p>
    The PostgreSQL JDBC Driver is distributed under the BSD-2-Clause License.
    The simplest explanation of the licensing terms is that
    you can do whatever you want with the product and source code as long
    as you don't claim you wrote it or sue us. You should give it a read
    though, it's only half a page.
  </p>
  <hr />
```

```
<pre style="font-family: monospace,'Courier'; background-color: #f9f9f9; padding: 1em; border: 1px solid #ddd">
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```

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```
</div> <!-- pgContentWrap -->
```

```
<br class="pgClearBoth" />
```

```
</div> <!-- pgContent -->
```

```
<hr />
```

```
<div id="pgFooter">
```

```
<a class="navFooter" href="https://www.postgresql.org/about/privacypolicy">Privacy Policy</a> |
```

```
<a class="navFooter" href="https://www.postgresql.org/about/">About PostgreSQL</a><br/>
```

```
Copyright &copy; 1996-2020 The PostgreSQL Global Development Group
```

```
</div> <!-- pgFooter -->
```

```
</div> <!-- pgContainer -->
```

```
</div> <!-- pgContainerWrap -->
```

```
</body>
```

```
</html>
```

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Version 1.0

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kafka-connect-jdbc

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\* HOMEPAGE: <https://github.com/xerial/sqlite-jdbc>

\* PostgreSQL JDBC Driver

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HOLDER OR OTHER PARTY HAS BEEN  
ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Last updated: 9 October 2018

```
<!DOCTYPE html><html class="wp"><head><meta charSet="utf-8"/><meta http-equiv="x-ua-compatible"
content="ie=edge"/><meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-
fit=no"/><style data-href="/styles.bac76730c08e59a2e76d.css">.style-module--anchorLinks--2mh4W{text-
align:center}@media screen and (min-width:992px){.style-module--anchorLinks--2mh4W{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center;margin:3px
0}}.style-module--link--1Ko78{color:#0074a2;text-transform:uppercase;font-weight:700;letter-spacing:1.2px;font-
size:12px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative;margin:0
20px;padding:10px 0}@media screen and (max-width:991px){.style-module--link--1Ko78:first-of-type{margin-
top:0;padding-top:0}}@media screen and (max-width:991px){.style-module--link--1Ko78:last-of-type{margin-
bottom:0;padding-bottom:0}}@media screen and (max-width:991px){.style-module--link--
1Ko78{display:block;margin:20px 0}}@media screen and (min-width:992px){.style-module--link--
1Ko78:not(:last-of-
type):after{content:"";width:1px;height:30px;background:rgba(130,148,148,.25);position:absolute;right:-
20px}}.style-module--animationElement--XoaLp{opacity:1}@media screen and (min-width:992px){.style-module-
-animationElement--XoaLp{opacity:0}.style-module--animationElement--XoaLp.style-module--fromTop--2tsTM{-
webkit-animation:style-module--fromTop--2tsTM .3s cubic-bezier(.21,.78,.76,.78) forwards;animation:style-
module--fromTop--2tsTM .3s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--animationElement--
XoaLp.style-module--fromRight--3EeXz{-webkit-animation:style-module--fromRight--3EeXz .5s cubic-
bezier(.21,.78,.76,.78) forwards;animation:style-module--fromRight--3EeXz .5s cubic-bezier(.21,.78,.76,.78)
forwards}.style-module--animationElement--XoaLp.style-module--fromBottom--6dP9P{-webkit-animation:style-
module--fromBottom--6dP9P .5s cubic-bezier(.21,.78,.76,.78) forwards;animation:style-module--fromBottom--
6dP9P .5s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--animationElement--XoaLp.style-module--
fromLeft--1q-9z{-webkit-animation:style-module--fromLeft--1q-9z .5s cubic-bezier(.21,.78,.76,.78)
forwards;animation:style-module--fromLeft--1q-9z .5s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--
animationElement--XoaLp.style-module--fadeIn--1P3t4{-webkit-animation:style-module--fadeIn--1P3t4 .5s cubic-
bezier(.21,.78,.76,.78) forwards;animation:style-module--fadeIn--1P3t4 .5s cubic-bezier(.21,.78,.76,.78)
forwards}}@-webkit-keyframes style-module--fromTop--2tsTM{0%{opacity:0;transform:translateY(-
15%)}to{opacity:1;transform:translateY(0)}}@keyframes style-module--fromTop--
2tsTM{0%{opacity:0;transform:translateY(-15%)}to{opacity:1;transform:translateY(0)}}@-webkit-keyframes
style-module--fromRight--
3EeXz{0%{transform:translateX(5%);opacity:0}50%{transform:translateX(0)}95%{opacity:1}to{transform:transla
teX(0);opacity:1}}@keyframes style-module--fromRight--
3EeXz{0%{transform:translateX(5%);opacity:0}50%{transform:translateX(0)}95%{opacity:1}to{transform:transla
teX(0);opacity:1}}@-webkit-keyframes style-module--fromBottom--
6dP9P{0%{opacity:0;transform:translateY(15%)}to{opacity:1;transform:translateY(0)}}@keyframes style-module-
-fromBottom--6dP9P{0%{opacity:0;transform:translateY(15%)}to{opacity:1;transform:translateY(0)}}@-webkit-
keyframes style-module--fromLeft--1q-9z{0%{transform:translateX(-
7%);opacity:0}50%{transform:translateX(0)}to{transform:translateX(0);opacity:1}}@keyframes style-module--
fromLeft--1q-9z{0%{transform:translateX(-
7%);opacity:0}50%{transform:translateX(0)}to{transform:translateX(0);opacity:1}}@-webkit-keyframes style-
```

```

module--fadeIn--1P3t4{to{opacity:1}}@keyframes style-module--fadeIn--1P3t4{to{opacity:1}}.style-module--
overlay--
3uWjl{background:rgba(0,0,0,.75);width:100%;height:100%;left:0;top:0;opacity:1;position:fixed;transition:all .25s
ease-in-out;z-index:100}.style-module--button--K11_E{transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(.785,.135,.15,.86);border-radius:6px;border-style:solid;border-width:1px;display:inline-block;font-
size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-
decoration:none;text-transform:uppercase;position:relative}.style-module--button--K11_E:hover{cursor:pointer;text-
decoration:none}.style-module--button--K11_E.style-module--island--3qX2T{background-color:#38cccd;border-
color:#38cccd;color:#fff}.style-module--button--K11_E.style-module--island--
3qX2T:hover{background:#173361;border-color:#173361}.style-module--button--K11_E.style-module--island--
3qX2T:disabled{background-color:#ccc;border-color:#ccc;color:#666;cursor:not-allowed}.style-module--button--
K11_E.style-module--denim--S1xvF{background-color:#173361;border-color:#173361;color:#fff}.style-module--
button--K11_E.style-module--denim--S1xvF:hover{background:#0074a2;border-color:#0074a2}.style-module--
button--K11_E.style-module--denimOutline--1Y1tC{background-color:transparent;border-
color:#173361;color:#173361}.style-module--button--K11_E.style-module--denimOutline--
1Y1tC:hover{background:#173361;color:#fff}.style-module--button--K11_E.style-module--white--
3e10p{background-color:#fff;border-color:#fff;color:#173361}.style-module--button--K11_E.style-module--white--
3e10p:hover{background:transparent;color:#fff}.style-module--button--K11_E.style-module--whiteOutline--3cb-
h{background-color:transparent;border-color:#fff;color:#fff}.style-module--button--K11_E.style-module--
whiteOutline--3cb-h:hover{background:#fff;color:#173361}.style-module--button--K11_E.style-module--purple--
1TxqH{background-color:#431d73;border-color:#431d73;color:#fff}.style-module--button--K11_E.style-module--
purple--1TxqH:hover{background:transparent;border-color:#431d73;color:#431d73}.style-module--button--
K11_E.style-module--purpleOutline--1C3T-{background-color:transparent;border-
color:#431d73;color:#431d73}.style-module--button--K11_E.style-module--purpleOutline--1C3T-
: hover{background:#431d73;color:#fff}.style-module--button--K11_E.style-module--green--2BSuQ{background-
color:#159e86;border-color:#159e86;color:#fff}.style-module--button--K11_E.style-module--green--
2BSuQ: hover{background:transparent;border-color:#159e86;color:#159e86}.style-module--button--K11_E.style-
module--greenOutline--25Pg7{background-color:transparent;border-color:#159e86;color:#159e86}.style-module--
button--K11_E.style-module--greenOutline--25Pg7: hover{background:#159e86;color:#fff}.style-module--button--
K11_E.style-module--blue--sASBN{background-color:#0dacc;border-color:#0dacc;color:#fff}.style-module--
button--K11_E.style-module--blue--sASBN: hover{background:transparent;border-
color:#0dacc;color:#0dacc}.style-module--button--K11_E.style-module--blueOutline--yXs7S{background-
color:transparent;border-color:#0dacc;color:#0dacc}.style-module--button--K11_E.style-module--blueOutline--
yXs7S: hover{background:#0dacc;color:#fff}.style-module--button--K11_E.style-module--orange--
3FGxM{background-color:#e37d62;border-color:#e37d62;color:#fff}.style-module--button--K11_E.style-module--
orange--3FGxM: hover{background:transparent;border-color:#e37d62;color:#e37d62}.style-module--button--
K11_E.style-module--orangeOutline--Omcu9{background-color:transparent;border-
color:#e37d62;color:#e37d62}.style-module--button--K11_E.style-module--orangeOutline--
Omcu9: hover{background:#e37d62;color:#fff}.style-module--button--K11_E.style-module--grey--
2lpBY{background-color:#58788c;border-color:#58788c;color:#fff}.style-module--button--K11_E.style-module--
grey--2lpBY: hover{background:transparent;border-color:#58788c;color:#58788c}.style-module--button--
K11_E.style-module--greyOutline--3JM3v{background-color:transparent;border-
color:#58788c;color:#58788c}.style-module--button--K11_E.style-module--greyOutline--
3JM3v: hover{background:#58788c;color:#fff}.style-module--button--K11_E.style-module--boxShadow--
32GhS{padding:50px 30px;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;border:1px
solid rgba(130,148,148,.25);border-radius:8px;margin:0 5px;transition:all .3s ease}.style-module--button--
K11_E.style-module--boxShadow--32GhS.style-module--fromBottom--1KdMI:after{opacity:0;bottom:-5%}.style-
module--button--K11_E.style-module--boxShadow--32GhS.style-module--fromBottom--

```

```

1KdMI:hover:after{ opacity:1;bottom:5px }.style-module--button--K11_E.style-module--boxShadow--32GhS.style-
module--fromLeft--mzMqk:after{ opacity:0;top:calc(50% - 9px);right:6px }.style-module--button--K11_E.style-
module--boxShadow--32GhS.style-module--fromLeft--mzMqk:hover:after{ opacity:1;right:1px }.style-module--
button--K11_E.style-module--boxShadow--
32GhS:after{ content:"";position:absolute;width:20px;height:20px;background-
image:url("https://d33wubrfki0l68.cloudfront.net/1d1bc6e441a34bc38df8118a4d8541cffe6a6412/13d9c/icons/arrow
_line.inline.svg");background-repeat:no-repeat;transition:all .3s ease }.style-module--button--K11_E.style-module--
boxShadow--32GhS img{-o-object-fit:contain;object-fit:contain }.style-module--button--K11_E.style-module--
boxShadow--32GhS: hover{ box-shadow:0 4px 15px rgba(0,0,0,.25)}.style-module--button--
K11_E:disabled{ background-color:rgba(130,148,148,.25)!important;cursor:not-allowed!important;border-
color:rgba(130,148,148,.25)!important }.style-module--footnote--2QqUZ{ font-weight:300;font-
size:12px;color:#000;display:block;margin-top:15px }.style-module--arrow--
2RnsV{ position:relative;cursor:pointer }.style-module--arrow--2RnsV:after,.style-module--arrow--
2RnsV:before{ content:"";position:absolute;background-color:#173361;transition:all .4s cubic-
bezier(1,.07,.28,1.04);width:15px;height:2px }.style-module--left--fNXOv:before,.style-module--right--
1dAD9:after{-ms-transform:rotate(-45deg);transform:rotate(-45deg)}.style-module--left--fNXOv:after,.style-
module--right--1dAD9:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.style-module--left--
fNXOv:after,.style-module--left--fNXOv:before,.style-module--right--1dAD9:after,.style-module--right--
1dAD9:before{ left:0 }.style-module--left--fNXOv.style-module--sm--ib37X:after,.style-module--left--fNXOv.style-
module--sm--ib37X:before,.style-module--right--1dAD9.style-module--sm--ib37X:after,.style-module--right--
1dAD9.style-module--sm--ib37X:before{ width:8px }.style-module--left--fNXOv.style-module--sm--
ib37X:before,.style-module--right--1dAD9.style-module--sm--ib37X:before{ top:3px }.style-module--left--
fNXOv.style-module--sm--ib37X:after,.style-module--right--1dAD9.style-module--sm--ib37X:after{ top:9px }.style-
module--left--fNXOv.style-module--md--1r7eR:before,.style-module--right--1dAD9.style-module--md--
1r7eR:before{ top:5px }.style-module--left--fNXOv.style-module--md--1r7eR:after,.style-module--right--
1dAD9.style-module--md--1r7eR:after{ top:15px }.style-module--down--cdTKv:before{-ms-
transform:rotate(45deg);transform:rotate(45deg)}.style-module--down--cdTKv:after{-ms-transform:rotate(-
45deg);transform:rotate(-45deg)}.style-module--up--1TDmI:before{-ms-
transform:rotate(135deg);transform:rotate(135deg)}.style-module--up--1TDmI:after{-ms-transform:rotate(-
135deg);transform:rotate(-135deg)}.style-module--down--cdTKv:after,.style-module--up--
1TDmI:after{ left:11px }.style-module--down--cdTKv.style-module--sm--ib37X:after,.style-module--down--
cdTKv.style-module--sm--ib37X:before,.style-module--up--1TDmI.style-module--sm--ib37X:after,.style-module--
up--1TDmI.style-module--sm--ib37X:before{ width:11px }.style-module--down--cdTKv.style-module--sm--
ib37X:after,.style-module--up--1TDmI.style-module--sm--ib37X:after{ left:7px }.style-module--theme_white--
2Exob:after,.style-module--theme_white--2Exob:before{ background-color:#fff }.style-module--theme_denim--
2OIpA:after,.style-module--theme_denim--2OIpA:before{ background-color:#173361 }.style-module--
theme_academy--1Az4R:after,.style-module--theme_academy--1Az4R:before{ background-color:#0074a2 }.style-
module--title--mJiqI{ color:#173361;font-size:18px;font-weight:700;line-height:23px;margin:0;padding:0 }.style-
module--title--mJiqI a{ color:#173361;text-decoration:underline }.style-module--label--sGt7o{ color:#173361;font-
size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;line-height:1;margin-bottom:15px;text-
transform:uppercase }.style-module--main--1i9BQ{ color:#0074a2 }.style-module--subtitle--
1iPNp{ color:#829494 }.style-module--main--1i9BQ+.style-module--subtitle--1iPNp:before{ content:" | " }.style-
module--footnote--szfSW{ position:absolute;top:calc(100% + 10px);left:0;right:0;font-weight:300;font-
size:12px;color:#000 }.style-module--card--2PEGL{ background-color:#fff;border-radius:8px;margin-
bottom:10px;padding:25px;display:-ms-flexbox;display:flex;position:relative;color:#173361;font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0 }.style-module--card--2PEGL:first-child:last-child{ margin-
bottom:0 }.style-module--card--2PEGL.style-module--style_list--3UZC3 .style-module--blurb--3eRIs
ul{ margin:0;padding:0;list-style:none }.style-module--card--2PEGL.style-module--style_stack--3ie4F{ text-

```



```

container--3NHJW.style-module--defaultArrows--V48oD .slick-next:before{ content:"\F105";padding-
left:10px }.style-module--container--3NHJW.style-module--defaultArrows--V48oD:hover .slick-
arrow{ opacity:1;width:55px }.style-module--container--3NHJW.style-module--simpleArrows--1nTC0{ display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center }.style-module--container--3NHJW.style-module--
simpleArrows--1nTC0 .slick-arrow{ background:none;color:transparent;z-index:10}@media screen and (max-
width:991px){ .style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .slick-
arrow{ display:none } }.style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .slick-list{-ms-flex:1
1;flex:1 1;margin:0 30px }.style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .style-module--
dots--2oV0K{ position:absolute;top:100%;left:50%;-ms-transform:translate(-50%,20px);transform:translate(-
50%,20px);margin:0 }.style-module--dots--2oV0K{ display:block;margin:20px 0 0;padding:0;list-style:none;text-
align:center }.style-module--dots--2oV0K li{ cursor:pointer;display:inline-block;margin-right:10px }.style-module--
dots--2oV0K li:last-child{ margin-right:0 }.style-module--dots--2oV0K li
span{ width:12px;height:12px;background:#fff;border-radius:50px;display:block;border:1px solid #173361 }.style-
module--dots--2oV0K li.slick-active span{ background:#173361 }.style-module--theme_academy--1hrGrC .style-
module--dots--2oV0K li span{ border-color:#0074a2 }.style-module--theme_academy--1hrGrC .style-module--dots--
2oV0K li.slick-active span{ background:#0074a2 }.style-module--close--f6-
7U{ position:absolute;right:10px;top:10px;cursor:pointer;opacity:.5;height:25px;width:25px;z-index:3;transition:all
.25s ease-in-out }.style-module--close--f6-7U:hover{ opacity:1;-ms-transform:scale(.9);transform:scale(.9) }.style-
module--close--f6-7U:after,.style-module--close--f6-7U:before{ position:absolute;left:15px;content:"
";height:20px;width:2px;background-color:#173361 }.style-module--close--f6-7U:before{-ms-
transform:rotate(45deg);transform:rotate(45deg) }.style-module--close--f6-7U:after{-ms-transform:rotate(-
45deg);transform:rotate(-45deg) }.style-module--grid--3kV-8{ display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:start;justify-content:flex-start;width:100% } @media screen and (max-
width:767px){ .style-module--grid--3kV-8{-ms-flex-direction:column;flex-direction:column} }.style-module--grid--
3kV-8>div{ margin:0;width:100% } @media screen and (max-width:767px){ .style-module--grid--3kV-
8>div>div{ margin-top:10px } }.style-module--grid--3kV-8.style-module--col1--2h_Ja>div>div{ margin-
top:10px } @media screen and (min-width:768px){ .style-module--grid--3kV-8.style-module--col2--
2p2M7>div{ margin-top:10px;width:calc((100% - 10px)/2) }.style-module--grid--3kV-8.style-module--col2--
2p2M7>div:nth-child(2n){ margin-left:10px }.style-module--grid--3kV-8.style-module--col2--2p2M7>div:first-
child,.style-module--grid--3kV-8.style-module--col2--2p2M7>div:nth-child(2){ margin-top:0 } } @media screen and
(min-width:768px){ .style-module--grid--3kV-8.style-module--col3--3TXIt>div{ margin-top:10px;margin-
left:10px;width:calc((100% - 20px)/3) }.style-module--grid--3kV-8.style-module--col3--3TXIt>div:nth-
child(3n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--col3--3TXIt>div:first-child,.style-module--
grid--3kV-8.style-module--col3--3TXIt>div:nth-child(2),.style-module--grid--3kV-8.style-module--col3--
3TXIt>div:nth-child(3){ margin-top:0 } } @media screen and (min-width:768px) and (max-width:991px){ .style-
module--grid--3kV-8.style-module--col4--3H2qW>div{ margin-top:10px;margin-left:10px;width:calc((100% -
10px)/2) }.style-module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(odd){ margin-left:0 }.style-module-
-grid--3kV-8.style-module--col4--3H2qW>div:first-child,.style-module--grid--3kV-8.style-module--col4--
3H2qW>div:nth-child(2){ margin-top:0 } } @media screen and (min-width:992px){ .style-module--grid--3kV-8.style-
module--col4--3H2qW>div{ margin-top:10px;margin-left:10px;width:calc((100% - 30px)/4) }.style-module--grid--
3kV-8.style-module--col4--3H2qW>div:nth-child(4n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--
col4--3H2qW>div:first-child,.style-module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(2),.style-
module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(3),.style-module--grid--3kV-8.style-module--col4-
3H2qW>div:nth-child(4){ margin-top:0 } } @media screen and (min-width:768px){ .style-module--grid--3kV-8.style-
module--col5--1Ve_W>div{ margin-top:10px;margin-left:10px;width:calc((100% - 40px)/5) }.style-module--grid--
3kV-8.style-module--col5--1Ve_W>div:nth-child(5n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--
col5--1Ve_W>div:first-child,.style-module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(2),.style-
module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(3),.style-module--grid--3kV-8.style-module--col5--

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1Ve_W>div:nth-child(4),.style-module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(5){margin-
top:0} }.style-module--required--fqVjc{display:inline-block;color:#bf0000;font-size:13px;position:relative;top:-
3px}.style-module--input--3P0z6{background-color:#fff;border:2px solid hsla(0,0%,73.3%,.5);border-
radius:4px;width:100%;margin-bottom:5px;color:#000;font-size:14px;font-weight:300;line-
height:1.2;padding:10px}.style-module--input--3P0z6::-webkit-input-placeholder{color:#829494}.style-module--
input--3P0z6::-moz-placeholder{color:#829494}.style-module--input--3P0z6:-ms-input-
placeholder{color:#829494}.style-module--input--3P0z6::placeholder{color:#829494}.style-module--input--
3P0z6.style-module--error--2b0DF{border-color:#d8365d}.style-module--input--3P0z6[type=checkbox].style-
module--error--2b0DF+span{box-shadow:inset 0 0 0 2px #d8365d}.style-module--container--1xvMb{display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative;margin:0}.style-module--container--
1xvMb+.style-module--container--1xvMb{margin-top:10px}.style-module--container--1xvMb.style-module--
checkbox--2Ha9r,.style-module--container--1xvMb input{width:25px;height:25px}.style-module--label--
2uunW{color:#000;font-size:14px;font-weight:300;line-height:18px;margin:0;cursor:pointer}.style-module--
inputContainer--2JVku{margin-right:10px}.style-module--inputContainer--2JVku
input{position:absolute;opacity:0;margin:0;z-index:1}.style-module--checkbox--2Ha9r{display:block;border:1px
solid #173361;transition:all .2s ease-in-out;background:#fff;border-
radius:4px;position:relative;cursor:pointer}.style-module--checkbox--
2Ha9r:after{content:"";position:absolute;display:none;background-color:#173361;width:100%;height:100%}.style-
module--input--CKpKC{width:auto;cursor:pointer}.style-module--input--CKpKC.style-module--error--
1LQt5,.style-module--input--CKpKC:checked+.style-module--checkbox--2Ha9r:after{display:block}.style-module-
input--CKpKC.style-module--error--1LQt5+.style-module--checkbox--2Ha9r{border-color:#d8365d}.style-
module--sm--3v0C2 .style-module--checkbox--2Ha9r,.style-module--sm--3v0C2
input{width:15px;height:15px}.style-module--sm--3v0C2 .style-module--label--2uunW{font-size:11px;line-
height:14px}.style-module--academy--iGYzj .style-module--checkbox--2Ha9r{border-color:#0074a2}.style-
module--academy--iGYzj .style-module--checkbox--2Ha9r:after{background-color:#0074a2}.style-module--
container--2hvXD,.style-module--menu--1h96n,.style-module--mobile--14cbj select{border-radius:4px;border:2px
solid rgba(130,148,148,.25);background-color:#fff;padding:6px 15px;width:100%;display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:center;align-
items:center;cursor:pointer;position:relative;color:#829494;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}@media screen and (max-width:767px){.style-module--container--2hvXD,.style-module--menu--
1h96n,.style-module--mobile--14cbj select{max-width:none}}@media screen and (max-width:767px){.style-
module--select--3SFOn .style-module--container--2hvXD{display:none}}.style-module--select--3SFOn .style-
module--menu--1h96n{padding:0;z-index:10;position:absolute;top:38px;left:-2px;width:calc(100% + 4px);max-
height:0;opacity:0;overflow:hidden;transition:all .5s ease-in-out}.style-module--select--3SFOn .style-module--
menu--1h96n ul{color:#173361;margin:0;padding:0;list-style:none;text-align:left;width:100%;max-
height:420px}.style-module--select--3SFOn .style-module--menu--1h96n ul li{padding:8px 15px;line-
height:1.75;white-space:nowrap;text-overflow:ellipsis;overflow-x:hidden}.style-module--select--3SFOn .style-
module--menu--1h96n ul li.style-module--selected--3yaOi,.style-module--select--3SFOn .style-module--menu--
1h96n ul li:hover{font-weight:700;background:hsla(0,0%,96.1%,.85)}.style-module--select--3SFOn .style-module--
menu--1h96n.style-module--overflow--1RxFl ul{overflow-y:scroll}.style-module--select--3SFOn.style-module--
fullWidth--2xKDP .style-module--container--2hvXD,.style-module--select--3SFOn.style-module--fullWidth--
2xKDP .style-module--menu--1h96n{max-width:none}.style-module--select--3SFOn.style-module--error--3hwWy
.style-module--container--2hvXD{border-color:#d8365d}.style-module--select--3SFOn.style-module--isOpen--
1d_xH .style-module--container--2hvXD{color:#173361;border-bottom-left-radius:0;border-bottom-right-
radius:0}.style-module--select--3SFOn.style-module--isOpen--1d_xH .style-module--menu--1h96n{max-
height:420px;opacity:1;border-top-left-radius:0;border-top-right-radius:0}.style-module--select--3SFOn.style-
module--hasValue--1Ju1P .style-module--container--2hvXD{color:#173361}.style-module--icon--2tH3R{margin-
right:15px}.style-module--mobile--14cbj{display:none;position:relative;width:100%}@media screen and (max-

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width:767px){.style-module--mobile--14cbj{display:inline-block}}.style-module--mobile--14cbj
select{height:40px;-webkit-appearance:none;-moz-appearance:none;appearance:none;cursor:pointer}.style-module-
-mobile--14cbj.style-module--icon--2tH3R{position:absolute;top:50%;right:20px}.style-module--tagline--
3IYwW{color:#173361;font-size:12px;font-weight:500;letter-spacing:2.33px;line-height:2.29;text-
transform:uppercase;margin-bottom:10px}.style-module--tagline--3IYwW a{text-decoration:underline}.style-
module--hero--1nLoF{background-color:#b4e1e4;border-radius:8px;color:#173361;font-size:18px;font-
weight:300;line-height:1.39;margin:85px 25px 15px}@media screen and (max-width:767px){.style-module--hero--
1nLoF{border-radius:0;margin-left:0;margin-right:0}}@media print{.style-module--hero--1nLoF{margin-
top:0}}.style-module--hero--1nLoF h1{color:#173361;font-size:46px;font-weight:700;line-
height:1.26;margin:0}@media screen and (max-width:767px){.style-module--hero--1nLoF h1{font-size:28px;word-
break:break-word}}.style-module--hero--1nLoF h1 a{color:inherit;text-decoration:underline}.style-module--hero--
1nLoF .style-module--container--1TRql{background-size:40% 100%;background-repeat:no-repeat;background-
position:100% 0;max-width:1170px;margin:0 auto;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-
items:center;padding:100px 15px;-ms-flex-pack:center;justify-content:center;text-align:center}@media print{.style-
module--hero--1nLoF .style-module--container--1TRql{padding:20px 0}}@media screen and (max-
width:767px){.style-module--hero--1nLoF .style-module--container--1TRql{background-
image:none!important;height:auto;padding-top:50px;padding-bottom:50px}}.style-module--hero--1nLoF .style-
module--container--1TRql.style-module--afterContentBottom--3LpT1{-ms-flex-direction:column;flex-
direction:column}.style-module--hero--1nLoF .style-module--container--1TRql.style-module--afterContentBottom--
3LpT1 .style-module--afterContent--3dL4o{margin-top:100px}.style-module--hero--1nLoF .style-module--
container--1TRql .style-module--content--34byx{line-height:1.39;font-size:18px;font-weight:300;max-
width:90%;width:800px}@media screen and (max-width:991px){.style-module--hero--1nLoF .style-module--
container--1TRql .style-module--content--34byx{text-align:center;margin:auto}}.style-module--hero--1nLoF .style-
module--container--1TRql .style-module--content--34byx>p:first-of-type{margin-top:50px}@media screen and
(max-width:767px){.style-module--hero--1nLoF .style-module--container--1TRql .style-module--content--
34byx>p:first-of-type{margin-top:25px}}.style-module--hero--1nLoF .style-module--container--1TRql .style-
module--content--34byx p+p{margin-top:15px}.style-module--hero--1nLoF .style-module--container--1TRql .style-
module--imageContainer--ZuS-j{max-width:400px;margin-left:100px;-ms-flex-negative:0;flex-shrink:0}@media
screen and (max-width:991px){.style-module--hero--1nLoF .style-module--container--1TRql .style-module--
imageContainer--ZuS-j{display:none}}.style-module--hero--1nLoF .style-module--footnote--3qpiY{font-
weight:300;font-size:12px;color:#000;display:block;margin-top:15px}.style-module--hero--1nLoF .style-module--
ctaContainer--1IaN3{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-
align:center;align-items:center;margin-top:50px}@media screen and (max-width:767px){.style-module--hero--
1nLoF .style-module--ctaContainer--1IaN3{margin-top:25px}}@media screen and (min-width:576px){.style-
module--hero--1nLoF .style-module--ctaContainer--1IaN3{-ms-flex-direction:row;flex-direction:row;-ms-flex-
pack:center;justify-content:center}}.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--
button--2qoRp{min-width:141px;padding-left:40px;padding-right:40px}@media screen and (max-
width:575px){.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--button--2qoRp{min-
width:unset;max-width:270px;width:80%}}.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-
module--button--2qoRp+.style-module--button--2qoRp{margin-top:10px}@media screen and (min-
width:576px){.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--button--
2qoRp+.style-module--button--2qoRp{margin-left:10px;margin-top:0}}.style-module--hero--1nLoF .style-module--
textLeft--H18a_{-ms-flex-pack:start;justify-content:flex-start;text-align:left;width:95%}@media screen and (min-
width:768px) and (max-width:991px){.style-module--hero--1nLoF .style-module--textLeft--H18a_.style-module--
content--34byx{width:80%}}@media screen and (max-width:767px){.style-module--hero--1nLoF .style-module--
textLeft--H18a_.style-module--content--34byx{width:100%;-ms-flex-pack:center;justify-content:center;text-
align:center}}.style-module--hero--1nLoF .style-module--textLeft--H18a_.style-module--ctaContainer--1IaN3{-ms-
flex-pack:center;justify-content:center}@media screen and (min-width:992px){.style-module--hero--1nLoF .style-

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module--textLeft--Hl8a_ .style-module--ctaContainer--1IaN3{-ms-flex-pack:start;justify-content:flex-start}}.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6{padding-
top:100px;height:auto;position:relative}@media screen and (min-width:768px){.style-module--hero--1nLoF .style-
module--containerImageBottom--2LKI6{padding-bottom:258px}}@media screen and (max-width:767px){.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6{padding-top:50px}}.style-module--hero--
1nLoF .style-module--containerImageBottom--2LKI6 .style-module--image_bottom--zOEsm{margin-
top:60px;max-height:400px;position:absolute;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%)}@media screen and (min-width:768px){.style-module--hero--1nLoF .style-module--containerImageBottom--
2LKI6 .style-module--image_bottom--zOEsm{bottom:-210px}}@media screen and (max-width:767px){.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6 .style-module--image_bottom--
zOEsm{display:none}}.style-module--hero--1nLoF.style-module--denim--15Zqi{background-
color:#173361;color:#fff}.style-module--hero--1nLoF.style-module--denim--15Zqi h1{color:#fff}.style-module--
hero--1nLoF.style-module--denim--15Zqi .style-module--tagline--jeiwh{color:#38cccd}.style-module--hero--
1nLoF.style-module--academy--21rqe{background-color:#0074a2;color:#fff}.style-module--hero--1nLoF.style-
module--academy--21rqe .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--academy--21rqe
h1{color:#fff}.style-module--hero--1nLoF.style-module--island--1yBks{background-
color:#38cccd;color:#fff}.style-module--hero--1nLoF.style-module--island--1yBks .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--island--1yBks h1{color:#fff}.style-module--hero--1nLoF.style-
module--ice--1HVBN{background-color:#e6f5fb;color:#173361}.style-module--hero--1nLoF.style-module--ice--
1HVBN .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--ice--1HVBN
h1{color:#173361}.style-module--hero--1nLoF.style-module--darkPurple--3cUD3{background-
color:#431d73;color:#fff}.style-module--hero--1nLoF.style-module--darkPurple--3cUD3 .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--darkPurple--3cUD3 h1{color:#fff}.style-module--hero--
1nLoF.style-module--green--1pKlp{background-color:#159e86;color:#fff}.style-module--hero--1nLoF.style-
module--green--1pKlp .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--green--1pKlp
h1{color:#fff}.style-module--hero--1nLoF.style-module--blue--32EDh{background-color:#0dacc3;color:#fff}.style-
module--hero--1nLoF.style-module--blue--32EDh .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-
module--blue--32EDh h1{color:#fff}.style-module--hero--1nLoF.style-module--orange--3Nn0V{background-
color:#e37d62;color:#fff}.style-module--hero--1nLoF.style-module--orange--3Nn0V .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--orange--3Nn0V h1{color:#fff}.style-module--hero--1nLoF.style-
module--grey--b1HtI{background-color:#58788c;color:#fff}.style-module--hero--1nLoF.style-module--grey--b1HtI
.style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--grey--b1HtI h1{color:#fff}.style-module--
hero--1nLoF.style-module--white--2ExPf{background-color:#fff;color:#173361}.style-module--hero--1nLoF.style-
module--white--2ExPf h1{color:#173361}.style-module--hero--1nLoF.style-module--white--2ExPf .style-module--
tagline--jeiwh{color:#0074a2}.wp .style-module--hero--1nLoF{margin-top:5px!important;margin-bottom:0}.wp
.style-module--hero--1nLoF p{color:#173361;line-height:1.39;font-size:18px;font-weight:300}.style-module--
thankyou--2DaBZ{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-
module--thankyou--2DaBZ{font-size:21px}}.style-module--container--
v6Tvx{position:fixed;top:0;left:0;width:100%;height:100%;z-index:100;pointer-events:none}.style-module--
content--3Dxe5{position:fixed;top:100%;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);background:#fff;margin:0 auto;border-radius:5px;height:auto;width:100%;max-width:700px;max-
height:80%;padding:30px;transition:all .25s ease-in-out;z-index:200}.style-module--close--
1K7Mo{position:absolute;right:33px;top:33px;cursor:pointer;opacity:.5;height:25px;width:25px;z-
index:200;transition:all .25s ease-in-out}.style-module--close--1K7Mo:after,.style-module--close--
1K7Mo:after,.style-module--close--1K7Mo:before{position:absolute;left:15px;content:"
";height:30px;width:3px;background-color:#333}.style-module--close--1K7Mo.style-module--sm--
3FBda:after,.style-module--close--1K7Mo.style-module--sm--3FBda:before{height:20px}.style-module--close--
1K7Mo:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.style-module--close--1K7Mo:after{-ms-

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transform:rotate(-45deg);transform:rotate(-45deg)}.style-module--active--2tAbX{pointer-events:auto}.style-
module--active--2tAbX.style-module--content--3Dxe5{top:50%;left:50%;-ms-transform:translate(-50%,-
50%);transform:translate(-50%,-50%)}.style-module--videoContainer--3o_eo
iframe{width:100%;height:100%;position:absolute;top:0;left:0}.style-module--videoContainer--3o_eo.style-
module--content--3Dxe5{background:#333;padding:0;width:100%;max-width:940px;height:auto;max-
height:540px;border-radius:0;opacity:0}.style-module--videoContainer--3o_eo.style-module--video--
qbhce{position:relative;width:100%;height:0;padding-bottom:56.25%}.style-module--videoContainer--3o_eo.style-
module--close--1K7Mo{top:-30px;right:-30px;opacity:.8}.style-module--videoContainer--3o_eo.style-module--
close--1K7Mo: hover{opacity:1}.style-module--videoContainer--3o_eo.style-module--close--1K7Mo:after,.style-
module--videoContainer--3o_eo.style-module--close--1K7Mo:before{background-color:#fff}.style-module--
videoContainer--3o_eo.style-module--active--2tAbX.style-module--content--3Dxe5{opacity:1}.style-module--
powder--BBZ_b{background:#d7eff6}.style-module--powder--BBZ_b.style-module--close--
1K7Mo{opacity:1}.style-module--powder--BBZ_b.style-module--close--1K7Mo: hover{opacity:.7}.style-module--
powder--BBZ_b.style-module--close--1K7Mo:after,.style-module--powder--BBZ_b.style-module--close--
1K7Mo:before{background-color:#0074a2}.style-module--pagination--2YHER ul{list-
style:none;margin:0;padding:0;text-align:center}@media screen and (max-width:767px){.style-module--pagination-
2YHER ul{display:none}}.style-module--pagination--2YHER ul li{display:inline-block;border-
radius:50%;color:#829494;margin:0 5px 5px}.style-module--pagination--2YHER ul li.style-module--dots--
3mYwl{vertical-align:bottom}.style-module--pagination--2YHER ul
li>{*{display:block;width:42px;height:42px;font-size:14px;border-radius:50%;text-align:center;border:1px solid
#829494;line-height:2.9;color:#fff}.style-module--pagination--2YHER ul li a{color:#829494;transition:none}.style-
module--pagination--2YHER ul li.style-module--selected--1eCAQ>*,.style-module--pagination--2YHER ul li
a: hover{background:#0074a2;border-color:#0074a2;color:#fff;text-decoration:none}.style-module--pagination--
2YHER ul li.style-module--nextPrev--1p0Y7{*{font-size:35px;line-height:1;border:0;color:#0074a2;width:auto;height:auto}.style-
module--pagination--2YHER ul li.style-module--nextPrev--1p0Y7>: hover{background:none;color:#0074a2}.style-
module--pagination--2YHER .style-module--select--3RbV5{display:none;width:150px;margin:0 auto}@media
screen and (max-width:767px){.style-module--pagination--2YHER .style-module--select--
3RbV5{display:block}}.style-module--searchResultsHeader--1mw-i{display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center;margin-bottom:50px}.style-module--searchResultsHeader--1mw-i
h4{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-module--
searchResultsHeader--1mw-i h4{font-size:21px}}.style-module--searchResultsHeader--1mw-i .style-module--clear-
24W_M{background:#c4c4c4;border-radius:50%;color:#fff;cursor:pointer;width:20px;height:20px;margin-
left:5px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-pack:center;justify-
content:center;font-size:18px}.style-module--searchSimpleFormOverlay--
wdr1p{opacity:0;position:fixed;top:50%;left:50%;z-index:105;max-width:720px;width:100%;-ms-
transform:translate(-50%,-50%);transform:translate(-50%,-50%);transition:all .3s ease-in-out;pointer-
events:none}.style-module--searchSimpleFormOverlay--wdr1p input{width:100%;padding:20px;border:0;border-
radius:8px;outline:none;font-size:18px;color:rgba(0,0,0,.85)}.style-module--searchSimpleFormOverlay--
wdr1p.style-module--active--1zCL5{opacity:1;pointer-events:all}.style-module--titleEyebrow--
1cR4_{color:#173361;font-size:40px;font-weight:500;margin:0 auto 100px;max-width:760px;width:80%;padding-
top:50px;padding-bottom:0;position:relative;text-align:center}@media screen and (max-width:767px){.style-
module--titleEyebrow--1cR4_{font-size:24px;padding-top:30px;margin-bottom:30px}}.style-module--
titleEyebrow--
1cR4_ .before{content:"";width:40px;height:4px;background:#38cccd;border:0;position:absolute;top:0;left:50%;-
ms-transform:translateX(-50%);transform:translateX(-50%);border-radius:10px}.style-module--purple--
2xL6D: before{background:#551d9d}.style-module--green--140Xz: before{background:#159e86}.style-module--
blue--3wFL2: before{background:#0dacc}.style-module--orange--19EsT: before{background:#e37d62}.style-

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module--grey--3eDVD:before{background:#58788c}.style-module--sectionTitle--2jZI\_{text-align:center;max-width:960px;width:90%;margin:0 auto}.style-module--sectionTitle--2jZI\_.style-module--hasSummary--1no4l{margin-bottom:50px}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_.style-module--hasSummary--1no4l{margin-bottom:30px}}.style-module--sectionTitle--2jZI\_:not(.style-module--hasSummary--1no4l){margin-bottom:100px}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_:not(.style-module--hasSummary--1no4l){margin-bottom:50px}}.style-module--sectionTitle--2jZI\_.style-module--title--3Euzj{margin-bottom:0}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_.style-module--title--3Euzj{line-height:1}}.style-module--browless--CHF2O{text-align:center;margin-bottom:50px}.style-module--browless--CHF2O h3{color:#000;font-size:28px;font-weight:500;padding:0}.style-module--summary--2q5sK{width:830px;max-width:100%;margin:50px auto 100px;font-size:16px;font-weight:300;line-height:1.56;text-align:center}@media screen and (max-width:767px){.style-module--summary--2q5sK{margin-top:30px;margin-bottom:50px}}.style-module--summary--2q5sK.style-module--denim--1DoX9{font-weight:500;font-size:20px;color:#173361}.style-module--section--2XsCV{background-color:transparent;border-radius:8px;margin:0 25px;background:hsla(0,0%,96.1%,.85);padding:50px 0}@media screen and (max-width:767px){.style-module--section--2XsCV{border-radius:0;margin-left:0;margin-right:0}}.style-module--section--2XsCV.style-module--robinsEgg--LFgus{background:#b4e1e4}.style-module--section--2XsCV.style-module--ice--30OgX{background:#e6f5fb}.style-module--section--2XsCV.style-module--noBg--180h6{background:none}.style-module--section--2XsCV.style-module--noBg--180h6:first-child,.style-module--section--2XsCV.style-module--noBg--180h6:first-of-type{padding-top:0}.style-module--section--2XsCV.style-module--alignCenter--1L8\_q{text-align:center}.style-module--section--2XsCV.style-module--hasOneLiner--1p7m-.style-module--title--wHTN1{margin-bottom:50px}@media screen and (min-width:768px){.style-module--section--2XsCV.style-module--spacing\_medium--D-7ZH{padding:50px 0}}@media screen and (min-width:768px){.style-module--section--2XsCV.style-module--spacing\_large--cQa4H{padding:100px 0}}.style-module--oneLiner--1FdcA{margin-bottom:50px;text-align:center}.style-module--contentContainer--1LvB{margin:0 auto;max-width:1170px;padding-left:15px;padding-right:15px;width:auto}@media screen and (min-width:768px) and (max-width:991px){.style-module--contentContainer--1LvB.style-module--noBg--180h6{padding-left:0;padding-right:0}}@media screen and (min-width:992px) and (max-width:1199px){.style-module--contentContainer--1LvB.style-module--noBg--180h6{padding-left:0;padding-right:0}}.style-module--paragraph--2KB8F{width:35%;margin:0 auto;line-height:1.63;color:#000;font-size:18px;font-weight:300}@media screen and (max-width:767px){.style-module--paragraph--2KB8F{width:90%}}.style-module--ctaContainer--pFbUg{margin:100px auto 0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (max-width:991px){.style-module--ctaContainer--pFbUg{margin:50px auto 0}}@media screen and (max-width:575px){.style-module--ctaContainer--pFbUg{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--ctaContainer--pFbUg>:not(:first-child){margin-left:20px}@media screen and (max-width:575px){.style-module--ctaContainer--pFbUg>:not(:first-child){margin-top:20px;margin-left:0}}.style-module--icon--22aj0{width:40px;max-width:none}.style-module--card--13DnA{color:#000}.style-module--card--13DnA p{margin:0 0 25px}.style-module--card--13DnA p img{float:left;margin-right:15px}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo{-ms-flex-item-align:start;align-self:flex-start}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo img{max-width:370px}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo svg{width:370px}.style-module--section--37qRW .style-module--imageContainer--171BX{width:270px}.style-module--section--37qRW .style-module--card--2bKAt{border-width:7px;margin-bottom:0}.style-module--section--37qRW .style-module--dot--3tfYP{display:block}.style-module--button--17RR7+.style-module--button--17RR7{margin-left:10px}@media screen and (max-width:575px){.style-module--button--17RR7+.style-module--button--17RR7{margin-left:0;margin-top:10px}}.style-module--sectionContent--1W6av{padding:25px}.style-module--sectionContent--1W6av h1,.style-module--sectionContent--1W6av h2,.style-module--sectionContent--1W6av h3{color:#173361;margin:25px 0 15px;padding:0}.style-module--sectionContent--1W6av h3{color:#173361;font-size:18px;font-weight:700;line-height:23px}@media screen and (max-

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width:767px}{.style-module--sectionContent--1W6av{margin:0 15px;text-align:center}}.style-module--
sectionContent--1W6av.style-module--bg_white--13ZJH{background-color:#fff}.style-module--sectionContent--
1W6av .style-module--contentContainer--3Qcyf{-ms-flex:1 1;flex:1 1}.style-module--sectionContent--1W6av
.style-module--imageContainer--291eb{max-width:470px}@media screen and (max-width:767px){.style-module--
sectionContent--1W6av .style-module--imageContainer--291eb{margin:0 auto}}@media screen and (min-
width:768px){.style-module--left--1sbqu .style-module--grid--2J6vK .style-module--contentContainer--
3Qcyf,.style-module--right--3LEvb .style-module--grid--2J6vK .style-module--imageContainer--291eb{margin-
left:25px!important}}@media screen and (max-width:767px){.style-module--left--1sbqu .style-module--grid--
2J6vK .style-module--contentContainer--3Qcyf,.style-module--right--3LEvb .style-module--grid--2J6vK .style-
module--imageContainer--291eb{margin-top:25px!important}}.style-module--left--1sbqu .style-module--grid--
2J6vK .style-module--imageContainer--291eb,.style-module--right--3LEvb .style-module--grid--2J6vK .style-
module--imageContainer--291eb{margin:0}@media screen and (max-width:767px){.style-module--left--1sbqu
.style-module--grid--2J6vK .style-module--imageContainer--291eb,.style-module--right--3LEvb .style-module--
grid--2J6vK .style-module--imageContainer--291eb{margin:0 auto}}@media screen and (min-width:768px){.style-
module--noImage--27tFT h2{margin-bottom:50px}}.style-module--noImage--27tFT ul{list-style-
position:inside}.style-module--noImage--27tFT .style-module--contentContainer--3Qcyf{margin:0;text-
align:center}.style-module--noImage--27tFT .style-module--sectionContent--1W6av{padding:0}.style-module--
ctaContainer--3vcVr{margin-top:50px}@media screen and (max-width:767px){.style-module--twoColumnTexts--
3GVuA ul{list-style-position:inside;padding:0;margin:0}}.style-module--twoColumnTexts--3GVuA .style-module--
imageContainer--291eb{margin:0 auto 25px;max-width:none;text-align:center}.style-module--twoColumnTexts--
3GVuA .style-module--imageContainer--291eb img{max-height:300px}.style-module--twoColumnTexts--3GVuA
.style-module--ctaContainer--3vcVr{text-align:center}@media screen and (min-width:768px){.style-module--
twoColumnTexts--3GVuA .style-module--grid--2J6vK>div:last-child{padding-left:15px}}@media screen and
(max-width:767px){.style-module--twoColumnTexts--3GVuA .style-module--grid--2J6vK>div:last-child{padding-
top:15px}}.style-module--section--2OZcS{padding-top:50px!important;padding-bottom:50px}.style-module--
section--2OZcS.style-module--sm--2e0EF{padding-top:20px!important;padding-bottom:20px}.style-module--
sectionImage--2VxLy{-ms-flex-align:center;align-items:center}.style-module--sectionImage--2VxLy .style-module-
imageContainer--1ryhq{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-
flex-align:center;align-items:center;text-align:center}@media screen and (max-width:991px){.style-module--
sectionImage--2VxLy .style-module--imageContainer--1ryhq{margin:20px 0}}@media screen and (max-
width:991px){.style-module--sectionImage--2VxLy .style-module--imageContainer--1ryhq:first-of-type{margin-
top:0}}@media screen and (max-width:991px){.style-module--sectionImage--2VxLy .style-module--
imageContainer--1ryhq:last-of-type{margin-bottom:0}}.style-module--sectionImage--2VxLy .style-module--
imageContainer--1ryhq img{max-width:100%;-o-object-fit:contain;object-fit:contain}.style-module--sectionImage--
2VxLy .style-module--imageContainer--1ryhq .style-module--title--3K_gD{color:#000;font-
size:14px;width:85%;margin-top:15px}.style-module--sectionImage--2VxLy .style-module--imageContainer--1ryhq
.style-module--title--3K_gD a{color:inherit;text-decoration:underline}.style-module--toc--3Z34A>div:first-child
h3{margin-top:0}.style-module--toc--3Z34A ul{list-style:none;margin:0;padding:0}.style-module--toc--3Z34A ul
li{margin-bottom:10px}.style-module--toc--3Z34A ul li a{color:#173361;font-size:21px;font-weight:500;line-
height:27px}.style-module--faqContent--3OYeA>div:first-child h3{margin-top:0}.style-module--faqContent--
3OYeA .style-module--card--2yIN3{border:2px solid hsla(0,0%,96.1%,.85);border-radius:8px;margin-
bottom:10px;padding:25px}.style-module--faqContent--3OYeA .style-module--card--2yIN3 h4{color:#173361;font-
size:18px;font-weight:700;line-height:23px}.style-module--faqContent--3OYeA .style-module--card--2yIN3
div{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--faq--2N00h{text-
align:left}.style-module--faq--2N00h hr{margin:90px 0;border-top:7px solid hsla(0,0%,96.1%,.85)}.style-module--
faq--2N00h h3{color:#000;font-size:28px;font-weight:500;margin:50px 0 30px}@media screen and (max-
width:767px){.style-module--faq--2N00h h3{font-size:21px}}.style-module--featuredPartnersSection--
1dyfM{margin-bottom:0}@media screen and (min-width:576px) and (max-width:767px){.style-module--

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featuredPartnersSection--1dyfM .style-module--grid--1yELm{-ms-flex-direction:row;flex-direction:row}}.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center;-ms-flex-pack:start;justify-content:flex-start;padding:0 40px 60px}@media screen and (min-width:576px) and (max-width:767px){.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11{margin:0;width:50%}}.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 .style-module--imageContainer--3EjXP{max-width:200px;height:100px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 .style-module--imageContainer--3EjXP{width:100%}.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 a{margin-top:20px}@media screen and (min-width:576px) and (max-width:767px){.style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 a{margin:0}}.style-module--header--31rfm{position:fixed;top:0;left:0;background:#fff;width:100%;z-index:20;height:85px;padding:18px 0;box-shadow:0 4px 10px -3px #829494;transition:box-shadow .3s ease-in-out}@media print{.style-module--header--31rfm{position:relative}}.style-module--header--31rfm

{margin:0;padding:0;list-style:none}.style-module--header--31rfm.style-module--topPage--85hNf{box-shadow:none}@media screen and (min-width:768px) and (max-width:991px){.style-module--header--31rfm>.style-module--container--3N3ii{width:100%;padding-left:25px;padding-right:25px}}.style-module--header--31rfm .style-module--nav--1mswf{float:right;display:block}@media screen and (max-width:767px){.style-module--header--31rfm .style-module--nav--1mswf{display:none}}@media screen and (max-width:920px){.style-module--header--31rfm .style-module--nav--1mswf{display:none}}.style-module--header--31rfm .style-module--nav--1mswf>ul>li{display:inline-block;margin:0 15px;position:relative}@media screen and (min-width:1200px){.style-module--header--31rfm .style-module--nav--1mswf>ul>li{margin:0 20px}}.style-module--header--31rfm .style-module--nav--1mswf>ul>li>a{display:block;font-size:14px;font-weight:400;letter-spacing:.7px;text-transform:uppercase;text-decoration:none;-ms-transform:none!important;transform:none!important}.style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR) a{color:#173361}.style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR)>ul{display:block;background:#fff;color:#15202b;position:absolute;top:58px;left:-60px;padding:10px 10px 10px 0;border-radius:7px;transition:all .3s ease-in-out;opacity:0;visibility:hidden;border:1px solid #e0e0e0;box-shadow:none;z-index:10}.style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR)>ul a{color:#173361;font-size:16px;font-weight:300;width:100%;display:block;white-space:nowrap;overflow:hidden;text-overflow:ellipsis;padding:10px 0;margin:0 20px;line-height:20px}.style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR):hover>a{border-bottom:5px solid #b78142;font-weight:400;color:#111820}.style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR):hover>ul{opacity:1;visibility:visible}.style-module--header--31rfm .style-module--nav--1mswf .style-module--indent--I5Hp9{margin-left:20px}.style-module--header--31rfm .style-module--logo--1fS2J{float:left;position:absolute;top:50%;-ms-transform:translateY(-50%);transform:translateY(-50%);z-index:99;margin-right:20px;background:#fff}.style-module--header--31rfm .style-module--logo--1fS2J svg{width:180px}@media screen and (min-width:1200px){.style-module--header--31rfm .style-module--logo--1fS2J svg{width:250px;max-width:none}}.style-module--header--31rfm .style-module--navMobile--1PXXZ{display:none}.style-module--header--31rfm .style-module--navMobile--1PXXZ nav{opacity:0;visibility:hidden;background:#111820;position:fixed;padding:1em 0 80px;left:0;width:100%;border-top:1px solid #4c4c4d;height:90%;transition:all .5s ease;overflow:auto;top:80px}.style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}.style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li{margin-bottom:20px}.style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li>a{color:#fff;text-transform:uppercase;padding:5px 20px;display:block}.style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li ul li a{color:#a7a7a8;text-transform:none;padding:5px 20px;display:block}@media screen and

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(max-width:920px){.style-module--header--31rfm .style-module--navMobile--1PXXZ{display:block}.style-
module--header--31rfm .style-module--navMobile--1PXXZ.style-module--open--2mcoG
nav{opacity:1;visibility:visible}.style-module--header--31rfm .style-module--navMobile--1PXXZ.style-module--
open--2mcoG>button .icon-bar{display:none}.style-module--header--31rfm .style-module--navMobile--
1PXXZ.style-module--open--2mcoG>button:after{content:"\D7";color:#111820;cursor:pointer;font-size:24px;line-
height:0;margin-left:5px;position:relative;top:0}.style-module--header--31rfm .style-module--navMobile--
1PXXZ>button{margin:0;display:block;padding:10px}.style-module--header--31rfm .style-module--navMobile--
1PXXZ .icon-bar{background-color:#111820}}.style-module--searchContainer--M0vVi{background:0
0;position:relative;float:right;margin-top:5px}@media screen and (max-width:920px){.style-module--
searchContainer--M0vVi{margin-top:3px}}@media screen and (min-width:992px){.style-module--
searchContainer--M0vVi{margin-right:20px}}.style-module--searchContainer--M0vVi>button{background-
color:transparent;border:0;outline:0;float:left;position:relative;z-index:2;text-align:left;text-indent:-
9999px;display:block;height:18px;width:18px;background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/search-icon.png);background-repeat:no-repeat;margin:9px;transition:width
.3s,left .1s,bottom .1s;padding:0;background-size:15px}.style-module--searchContainer--
M0vVi>div{float:left;overflow:hidden;position:relative;z-index:1;width:1px;transition:width .3s,left .1s,bottom
.1s}.style-module--searchContainer--M0vVi>div input{display:inline-block;font-size:14px;font-weight:400;line-
height:16px;float:left;height:32px;padding:0 20px 0 40px;color:#fff;border:0;border-radius:2px;background:0
0;width:200px;outline:0}.style-module--searchContainer--M0vVi.style-module--active--3q6zJ>button{z-
index:0;width:0;visibility:hidden}.style-module--searchContainer--M0vVi.style-module--active--
3q6zJ>div{width:220px}.style-module--searchContainer--M0vVi.style-module--active--3q6zJ>div
input{border:1px solid #333;color:#333}.style-module--languageContainer--
GbiNb{display:none;position:relative;float:right}.style-module--languageContainer--GbiNb ul{display:-ms-
flexbox;display:flex;list-style:none;max-width:40px;padding-left:0;border-
radius:8px;height:42px;overflow:hidden}.style-module--languageContainer--GbiNb ul:before{background-
color:#000;content:" ";display:block}.style-module--languageContainer--GbiNb ul li{-ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;margin:0;padding:6px 0}.style-module--languageContainer--GbiNb ul
li:before{background-size:cover;border:1px solid #979797;border-radius:20px;content:"";margin-left:0;margin-
right:10px;height:30px;width:30px}.style-module--languageContainer--GbiNb ul li a{display:none;color:#000;font-
size:12px}.style-module--languageContainer--GbiNb ul li.lang-en{-ms-flex-order:2;order:2;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-en:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/e10fc60db43311c1d7521b9005ba5d5257054e53/language-
english.png")}.style-module--languageContainer--GbiNb ul li.lang-fr{-ms-flex-order:3;order:3;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-fr:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/2357e84a1b7e54596e3d18f6ec5984174f7de42a/language-
french.png")}.style-module--languageContainer--GbiNb ul li.lang-de{-ms-flex-order:4;order:4;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-de:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/1604bda91e6e4972abb4b7030c72d17b49747417/language-
german.png")}.style-module--languageContainer--GbiNb ul li.lang-ja{-ms-flex-order:5;order:5;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-ja:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/b722710de108f10b5ecacce7634b1db48200fd8e/language-
japanese.png")}.style-module--languageContainer--GbiNb.style-module--open--2mcoG ul{height:100%;-ms-flex-
direction:column;flex-direction:column;max-width:130px;padding:0 15px}.style-module--languageContainer--
GbiNb.style-module--open--2mcoG ul li a{display:block}.style-module--languageContainer--GbiNb.style-module--
open--2mcoG .style-module--dropdown--39_e2{border:1px solid #979797;border-
radius:8px;background:#fff}.style-module--languageContainer--GbiNb.style-module--open--2mcoG .style-module--
toggle--3ljCl{-ms-transform:rotate(270deg);transform:rotate(270deg)}.style-module--languageContainer--GbiNb
.style-module--toggle--3ljCl{background-size:cover;cursor:pointer;display:inline-

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block;height:16px;position:absolute;right:-15px;top:14px;width:10px;background-
image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/link-arrow-black.png);-ms-
transform:rotate(90deg);transform:rotate(90deg)}@media screen and (min-width:992px){.style-module--
languageContainer--GbiNb{display:block}}.smartling-de .style-module--languageContainer--GbiNb .lang-
de,.smartling-fr .style-module--languageContainer--GbiNb .lang-fr,.smartling-ja .style-module--languageContainer--
GbiNb .lang-ja{-ms-flex-order:1;order:1}.style-module--logo--35JXe g{fill:#173361}.style-module--purple--Ofct3
.bg-fill{fill:#eee8f5}.style-module--purple--Ofct3 .line-fill{fill:#551d9d}.style-module--purple--Ofct3 .line-
stroke{stroke:#551d9d}.style-module--gdpr--2VS6b{opacity:0;transition:opacity .5s ease-in-out}.style-module--
gdpr--2VS6b.style-module--show--DiYdJ{opacity:1}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--
2QBT6{position:fixed;bottom:0;left:0;background:#173361;width:100%;color:#fff;z-index:11}@media screen and
(max-width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--button--
3srjX{margin:0}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT{padding:20px 40px;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-
content:space-between;-ms-flex-align:center;align-items:center;box-sizing:border-box}.style-module--gdpr--
2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT p{margin:0;font-
size:14px;font-weight:400}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprContent--3KsKx{-ms-flex:1 1;padding-right:200px}.style-
module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--
gdprContent--3KsKx a,.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprContent--3KsKx p{color:#fff}.style-module--gdpr--2VS6b.style-module--
gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprContent--3KsKx a{text-
decoration:underline}@media screen and (max-width:1024px){.style-module--gdpr--2VS6b.style-module--
gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprContent--3KsKx{padding-
right:0;padding-bottom:20px}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprRight--1UBvi{display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-child{margin-
left:10px}@media screen and (max-width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--
2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-
child{margin-left:0;margin-top:10px}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-
module--gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-
child:before{left:-7px}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX{min-width:100px}@media
screen and (max-width:991px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX{min-width:205px}}.style-
module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--
gdprRight--1UBvi button:last-of-type{margin-right:0;margin-left:20px}@media screen and (max-
width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--
1rFOT .style-module--gdprRight--1UBvi button:last-of-type{margin:0}}@media screen and (max-
width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--
1rFOT .style-module--gdprRight--1UBvi{-ms-flex-direction:column;flex-direction:column}}@media screen and
(max-width:1024px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--
gdprWrapper--1rFOT{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-
items:center}}.style-module--topBanner--
qjZvc{position:fixed;top:0;background:#070a1f;color:#fff;height:40px;width:100%;z-index:20;font-size:11px;font-
weight:500;letter-spacing:1.17px;overflow:hidden;text-overflow:ellipsis}.style-module--topBanner--qjZvc
.container div{line-height:4}.style-module--topBanner--qjZvc .container a{color:#fff;cursor:pointer;text-
decoration:none}.style-module--topBanner--qjZvc .style-module--text--

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n3hed{position:absolute;left:0;width:100%;text-align:center;z-index:1}.style-module--topBanner--qjZvc .style-module--phone--3dD5b{text-align:right;position:relative;z-index:2;float:right}.style-module--topBanner--qjZvc a.style-module--ogLink--1xHFT{color:#4597cb;margin-left:10px;transition:all .3s ease}.style-module--topBanner--qjZvc a.style-module--ogLink--1xHFT:hover{opacity:.6}.style-module--topBanner--qjZvc .style-module--longText--yBz3N{display:none}@media screen and (min-width:768px){.style-module--topBanner--qjZvc .style-module--longText--yBz3N{display:inline}}@media screen and (max-width:600px){.style-module--topBanner--qjZvc .style-module--phone--3dD5b{display:none}}.style-module--siteFooter--1SYvh{border-top:1px solid #e9e9ed}.style-module--siteFooter--1SYvh footer{background-color:#fff;padding:40px 0}.style-module--footerRow--2E2Yb{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (min-width:992px){.style-module--footerRow--2E2Yb{-ms-flex-pack:justify;justify-content:space-between}}@media screen and (min-width:1200px){.style-module--footerRow--2E2Yb{max-width:100%}}.style-module--footerRow--2E2Yb div:not(:last-of-type){display:none}@media screen and (min-width:992px){.style-module--footerRow--2E2Yb div:not(:last-of-type){display:-ms-flexbox;display:flex}}.style-module--menu--19Yv4{list-style:none;padding:0;color:#fff;font-size:16px;margin:0 0 20px}.style-module--menu--19Yv4 li{line-height:20px;margin:2px 0 12px}.style-module--menu--19Yv4 li:first-of-type{margin-bottom:25px}.style-module--menu--19Yv4 li:first-of-type a{color:#404040;font-weight:400;font-size:16px}.style-module--menu--19Yv4 li:first-of-type a:hover{transition:none;color:#404040}.style-module--menu--19Yv4 li a{font-weight:300;color:#5d5d5d;text-decoration:none;padding:2px 0;font-size:14px;line-height:18px;display:block}.style-module--menu--19Yv4 li a:hover{color:#4597cb;transition:all .4s ease-in-out}.style-module--socialNav--12Fjk ul{list-style:none;margin:0;padding:0;font-size:16px}.style-module--socialNav--12Fjk ul li{margin:0 5px}.style-module--socialIcon--PjnYm{width:20px;height:20px;fill:#a7a7a8}.style-module--socialIcon--PjnYm.style-module--twitterIcon--3zPrM:hover{fill:#55acee}.style-module--socialIcon--PjnYm.style-module--linkedinIcon--1E52K:hover{fill:#0e76a8}.style-module--socialIcon--PjnYm.style-module--githubIcon--2CHYh:hover{fill:#333}.style-module--socialIcon--PjnYm.style-module--slideshareIcon--3uHWi:hover{fill:#f7941e}.style-module--socialIcon--PjnYm.style-module--youtubeIcon--21oE-:hover{fill:red}.style-module--socialIcon--PjnYm.style-module--instagramIcon--3WweF:hover{fill:#c1558b}.style-module--socialIcon--PjnYm.style-module--facebookIcon--29Pqt:hover{fill:#3b5998}.style-module--socialMediaListContainer--m3scG{display:-ms-flexbox;display:flex}@media screen and (max-width:991px){.style-module--socialMediaListContainer--m3scG{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}}.style-module--footerBottom--Nm5lk{padding-top:40px}.style-module--copyright--1gcwO,.wp .style-module--copyright--1gcwO{max-width:100%;text-align:center}@media screen and (min-width:992px){.style-module--copyright--1gcwO,.wp .style-module--copyright--1gcwO{text-align:left}}.style-module--copyright--1gcwO p,.wp .style-module--copyright--1gcwO p{display:inline;font-size:11px;line-height:1.2;color:#a7a7a8;margin:0;padding:2px 0}.style-module--copyright--1gcwO p:first-of-type,.wp .style-module--copyright--1gcwO p:first-of-type{line-height:1.5;color:#a7a7a8;padding:0}.style-module--copyright--1gcwO p a,.wp .style-module--copyright--1gcwO p a{color:#535353;border:0;padding:0}.style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8,.wp .style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8{font-size:11px!important;color:#535353!important;border:0!important;padding:0!important}.style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8:hover,.wp .style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8:hover{text-decoration:underline;background-color:#fff!important}.wp .error404\_section{background-color:#2c3437}.wp .page-title{color:#fff;font-weight:400;margin-top:15px;margin-bottom:15px}.wp .error404-body{padding-top:30px;padding-bottom:80px}.wp .page-cloud-customer-dpa .dpa p,.wp .page-cloud-customer-dpa .dpa ul{color:#4a4a4a;font-size:16px;font-weight:300;list-style:none;line-height:26px;margin-bottom:18px}.wp .page-cloud-customer-dpa .dpa li{margin-bottom:9px}.wp .page-cloud-customer-dpa .dpa ul ul{margin-top:12px}.wp .page-cloud-customer-dpa .dpa .spacer{height:1px;margin-bottom:24px}.wp .page-cloud-customer-dpa .dpa h3,.wp .page-cloud-customer-dpa .dpa h4{color:#4a4a4a;margin-bottom:18px;text-align:center}.wp .page-cloud-customer-dpa .dpa h3{margin-bottom:30px!important}.confluent-privacy-statement-module--container--3nAUI{font-weight:300;line-height:1.78;color:#4a4a4a;font-

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size:18px}.confluent-privacy-statement-module--container--3nAU1 h2{font-size:30px;text-align:center}.confluent-
privacy-statement-module--container--3nAU1 h3{text-align:left;font-size:20px;text-transform:uppercase}.confluent-
privacy-statement-module--container--3nAU1 .confluent-privacy-statement-module--disc--2bGkH{list-style-
type:disc}.wp .page-supplemental-services-terms ol,.wp .page-supplemental-services-terms ul{font-size:18px;font-
weight:300;line-height:1.78;color:#4a4a4a}.wp .page-supplemental-services-terms ul{list-style-type:circle}.wp
.page-supplemental-services-terms ol{list-style-type:upper-alpha}.wp .page-supplemental-services-terms ol
li>ol{list-style-type:decimal}.wp .page-template-careers-rebrand section.careers_job_listings_section{text-
align:left}.wp .page-template-careers-rebrand section.careers_job_listings_section h3{margin-top:20px}.wp .page-
template-careers-rebrand section.careers_job_listings_section .jobs{margin-bottom:20px}.wp .page-template-
careers-rebrand section.careers_job_listings_section .job{clear:both;display:block;overflow:hidden;margin-
bottom:5px}.wp .page-template-careers-rebrand section.careers_job_listings_section .job .left{float:left}.wp .page-
template-careers-rebrand section.careers_job_listings_section .job .right{float:right}.wp .page-template-careers-
rebrand section.careers_job_listings_section .job .right a{min-width:100px}.wp .page-template-careers-rebrand
.carousel-item{display:-ms-flexbox!important;display:flex!important;-ms-flex-align:center;align-items:center;-ms-
flex-pack:center;justify-content:center;text-align:center}.wp .page-template-careers-rebrand .h3-border{text-
align:center;font-size:14px!important;font-weight:500;line-height:1.6px;text-transform:uppercase}.wp .page-
template-careers-rebrand .h3-
border:after{content:"";height:2px;width:40px;background:#257bd7;display:block;margin:5px
auto;position:relative}@media screen and (max-width:1000px){.wp .page-template-careers-rebrand .h3-
border:after{margin:5px auto 0}}.wp .page-template-careers-rebrand .btn{min-width:175px!important;border:1px
solid #173361;background:#fff;display:block;color:#173361;padding-top:12px;padding-bottom:14px;border-
radius:8px}.wp .page-template-careers-rebrand .btn:hover{background:#173361;color:#fff}.wp .page-template-
careers-rebrand .gradient-bluegreen{background-image:linear-gradient(270deg,#31bec2,#257bd7)}.wp .page-
template-careers-rebrand .container{max-width:1272px}.wp .page-template-careers-rebrand
.hero_overview{background-size:cover;background-position:bottom;height:100vh}@media screen and (max-
width:991px){.wp .page-template-careers-rebrand .hero_overview{background-position:inherit}}.wp .page-
template-careers-rebrand .hero_overview .hero-content{text-align:center;left:50%;max-
width:650px;position:absolute;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-
50%);top:50%;width:100%}.wp .page-template-careers-rebrand .hero_overview .hero-content h1,.wp .page-
template-careers-rebrand .hero_overview .hero-content p{color:#fff}.wp .page-template-careers-rebrand
.career__slider{margin:3px 0;overflow:hidden}.wp .page-template-careers-rebrand .career__slider .slick-slider,.wp
.page-template-careers-rebrand .career__slider .slick-slider img{height:434px!important}.wp .page-template-
careers-rebrand .career__slider .slick-slider .slick-track{display:-ms-flexbox;display:flex}.wp .page-template-
careers-rebrand .career__slider .slick-slider .slick-slide{width:800px!important;-ms-flex:0 0 800px;flex:0 0
800px;margin:0 3px}.wp .page-template-careers-rebrand .career__inspiration{padding:100px 0;text-
align:center}.wp .page-template-careers-rebrand .career__inspiration .container{max-width:650px}.wp .page-
template-careers-rebrand .career__inspiration h2{font-size:48px;line-height:1.15}.wp .page-template-careers-
rebrand .career__inspiration .btn{margin:0 auto;max-width:175px}.wp .page-template-careers-rebrand
.career__banner h3{color:#fff;font-size:24px;font-weight:700;line-height:1.2;padding:30px 0}.wp .page-template-
careers-rebrand .career__banner h3 a{color:#fff}.wp .page-template-careers-rebrand .career__banner h3
a:hover{text-decoration:underline}.wp .page-template-careers-rebrand .career__banner
img{width:60px!important;height:45px}.wp .page-template-careers-rebrand .career__pillars{padding:135px 0
150px}.wp .page-template-careers-rebrand .career__pillars .row{display:-ms-flexbox;display:flex;-ms-flex-
pack:center;justify-content:center;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (min-width:992px){.wp
.page-template-careers-rebrand .career__pillars .row{-ms-flex-pack:justify;justify-content:space-between}}.wp
.page-template-careers-rebrand .career__pillars .career__pillar{margin-bottom:25px;text-
align:center;width:48%}@media screen and (min-width:992px){.wp .page-template-careers-rebrand .career__pillars
.career__pillar{margin-bottom:0;width:18%}}.wp .page-template-careers-rebrand .career__pillars img{margin-

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bottom:25px;max-height:100px}.wp .page-template-careers-rebrand .career__pillars p{color:#fff;font-
weight:400;margin-bottom:0}.wp .page-template-careers-rebrand .career__pillars
svg{width:100px;height:100px;margin-bottom:20px}.wp .page-template-careers-rebrand .career__pillars svg
g{fill:#fff}.wp .page-template-careers-rebrand .careers_job_listings_section .filter-container{margin:20px
0;display:inline-block;min-width:300px}@media (min-width:768px){.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container:first-of-type{margin-right:15px}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container:last-of-type{margin-left:15px}}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container .select{border:1px solid
#ddd;background:#f3f4f8;display:block;color:#444;line-height:1.3;padding:8px 10px 8px 20px;font-size:18px;font-
weight:300;border-radius:4px;max-width:300px;width:100%;cursor:pointer;-moz-appearance:none;-webkit-
appearance:none;appearance:none;margin:0 auto}.wp .page-template-careers-rebrand .careers_job_listings_section
.filter-container .select:hover{border-color:#c4c4c4}.wp .page-template-careers-rebrand
.careers_job_listings_section .jobs-list{background:#fff;box-shadow:0 5px 27px 0 rgba(0,0,0,.05);border-
radius:4px;padding:30px}@media screen and (min-width:992px){.wp .page-template-careers-rebrand
.careers_job_listings_section .jobs-list{padding:60px}}@media (max-width:992px){.wp .page-template-careers-
rebrand .careers_job_listings_section .jobs-list .job{display:-ms-flexbox;display:flex;-ms-flex-
direction:column;flex-direction:column;padding:25px 0;box-shadow:0 4px 5px -6px #222;text-align:center}}.wp
.page-template-careers-rebrand .careers_job_listings_section .job{display:block;margin-bottom:20px;-ms-flex-
wrap:wrap;flex-wrap:wrap;overflow:inherit;text-align:center}.wp .page-template-careers-rebrand
.careers_job_listings_section .job .btn{max-width:175px;margin:0 auto}@media screen and (min-width:992px){.wp
.page-template-careers-rebrand .careers_job_listings_section .job{-ms-flex-align:center;align-items:center;display:-
ms-flexbox;display:flex;margin-bottom:5px;-ms-flex-pack:justify;justify-content:space-between;text-
align:inherit}.wp .page-template-careers-rebrand .careers_job_listings_section .job .btn{margin:0}}.wp .page-
template-careers-rebrand .careers_job_listings_section .job .left,.wp .page-template-careers-rebrand
.careers_job_listings_section .job .right{float:none}.wp .page-template-careers-rebrand .careers_job_listings_section
h2{text-align:center}@media screen and (min-width:992px){.wp .page-template-careers-rebrand
.careers_job_listings_section h2{font-size:48px;line-height:55px}}.wp .page-template-careers-rebrand
.careers_job_listings_section h3,.wp .page-template-careers-rebrand .careers_job_listings_section h4{font-
size:18px;line-height:24px}.wp .page-template-careers-rebrand .careers_job_listings_section
.commitment{background:#173361;border-radius:8px;color:#fff;font-size:12px;font-weight:600;line-
height:14px;margin-right:15px;padding:5px 10px;text-transform:uppercase;vertical-align:middle}@media screen
and (max-width:991px){.wp .page-template-careers-rebrand .careers_job_listings_section
.commitment{display:block}}.wp .page-template-careers-rebrand .careers_job_listings_section span{font-
size:18px;font-weight:300;line-height:21px}.wp .page-template-careers-rebrand .careers_job_listings_section
span.label{padding-top:8px;text-align:left}.wp .page-template-careers-rebrand .careers_job_listings_section .filter-
wrapper,.wp .page-template-careers-rebrand .careers_job_listings_section .no-jobs{text-align:center}.wp .page-
template-careers-rebrand .careers_job_listings_section .no-jobs{font-size:18px}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-wrapper{margin:50px 0}@media screen and (max-width:991px){.page-
template-certificate-page .certification-module--hero--1CWTC>div{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.page-template-certificate-page .certification-module--
hero--1CWTC .certification-module--imageContainer--33fsg{display:block;margin-left:0;margin-top:60px}}.page-
template-certificate-page .certification-module--hero--1CWTC .certification-module--imageContainer--33fsg
img{border:9px solid #81cfe2;cursor:pointer}.page-template-certificate-page .certification-module--
certificateOverviewSection--3aOWY{padding:60px 0 50px 0}.page-template-certificate-page .certification-module--
certificateOverviewSection--3aOWY p{max-width:800px;margin-left:auto;margin-right:auto;color:#4597cb;font-
size:25px;line-height:32px}.page-template-certificate-page .certification-module--certificateItemsSection--
1HUMO{padding:0!important;text-align:center!important}.page-template-certificate-page .certification-module--
certificateItemsSection--1HUMO h3,.page-template-certificate-page .certification-module--certificateItemsSection--

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1HUMO p{color:#fff}.page-template-certificate-page .certification-module--certificateItemsSection--1HUMO  
h3{font-size:25px}@media screen and (min-width:992px){.page-template-certificate-page .certification-module--  
certificateItemsSection--1HUMO h3{min-height:92px}}.page-template-certificate-page .certification-module--  
bgColorBlue--2eJfR{background-color:#4597cb}.page-template-certificate-page .certification-module--  
bgColorOrange--270dL{background-color:#173361}.page-template-certificate-page .certification-module--  
certItemUnorderedList--2khCH{text-align:left;color:#fff;list-style-type:disc;margin-bottom:38px}@media screen  
and (min-width:992px){.page-template-certificate-page .certification-module--certItemUnorderedList--  
2khCH{display:-ms-flexbox!important;display:flex!important}}.page-template-certificate-page .certification-  
module--items--2EvXj{list-style:none;display:block;padding:0;margin:0;overflow:hidden}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--items--2EvXj{display:-ms-  
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.page-template-certificate-page .certification-module--  
certificateItem--jApeq{padding:80px 20px!important}@media screen and (min-width:768px){.page-template-  
certificate-page .certification-module--certificateItem--jApeq{width:50%}}@media screen and (min-  
width:992px){.page-template-certificate-page .certification-module--certificateItem--jApeq{width:calc(33.33% -  
10px)!important;margin:0 5px!important}}.page-template-certificate-page .certification-module--certificateItem--  
jApeq .certification-module--item--11Jr8{position:relative}.page-template-certificate-page .certification-module--  
certificateItem--jApeq .certification-module--item--11Jr8 ul{color:#fff;margin:20px 0;text-align:left}.page-  
template-certificate-page .certification-module--media--37RII{margin:0}.page-template-certificate-page  
.certification-module--midContent--2hN3i{max-width:900px;margin-left:auto;margin-right:auto}.page-template-  
certificate-page .certification-module--certificateFaqSection--1TWw0 h2{color:#4597cb;font-size:48px;margin-  
bottom:40px;line-height:56px}.page-template-certificate-page .certification-module--certificateFaqSection--1TWw0  
h3{color:#4597cb;font-size:28px;text-align:left;margin-bottom:10px}.page-template-certificate-page .certification-  
module--certificateFaqSection--1TWw0 p{max-width:800px}.page-template-certificate-page .certification-module--  
faqsItems--y-uMZ{list-style:none;padding:0;margin:0;text-align:left}.page-template-certificate-page .certification-  
module--faqsItems--y-uMZ li{margin-bottom:40px}@media screen and (min-width:992px){.page-template-  
certificate-page .certification-module--mediaContent---T5KW{display:-ms-flexbox;display:flex;-ms-flex-  
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;min-  
height:308px;height:100%}}@media screen and (max-width:991px){.page-template-certificate-page .certification-  
module--mediaContent---T5KW{padding:0!important;text-align:center}}.page-template-certificate-page  
.certification-module--mediaContent---T5KW li{list-style-type:disc}.page-template-certificate-page .certification-  
module--mediaContent---T5KW h3{text-align:center}.page-template-certificate-page .certification-module--row--  
3abUE{-ms-flex-pack:justify;justify-content:space-between;margin-top:80px}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--row--3abUE{display:-ms-  
flexbox;display:flex}}.page-template-certificate-page .certification-module--h3Border--SFaPi{font-  
size:16px!important;line-height:21px!important;text-transform:uppercase;text-  
align:center;position:relative;padding-top:0!important}.page-template-certificate-page .certification-module--  
h3Border--SFaPi:after{content:"";height:2px;width:40px;background:#257bd7;margin-  
top:5px;display:block;position:absolute;left:50%;-ms-transform:translateX(-50%);transform:translateX(-  
50%)}.page-template-certificate-page .certification-module--benefits--36TgD{margin-top:80px}.page-template-  
certificate-page .certification-module--benefit--2Qg0c{text-align:center}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--benefit--2Qg0c{-ms-flex:0 1 16%;flex:0 1  
16%}}.page-template-certificate-page .certification-module--benefit--2Qg0c img{max-width:50px;max-  
height:45px}.page-template-certificate-page .certification-module--benefit--2Qg0c .certification-module--  
benefitText--2rIS\_{font-size:16px;margin-top:20px}.page-template-certificate-page .certification-module--  
ctaContainer--1hwZR{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;margin-  
top:20px}.page-template-certificate-page .certification-module--ctaContainer--1hwZR .certification-module--  
button--3wfFd+.certification-module--button--3wfFd{margin-top:20px}.wp .page-community-code-of-conduct  
.coc-header{color:#101040!important;padding:30px 18px}.wp .page-community-code-of-conduct p{font-

size:16px;line-height:30px;max-width:750px }.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2,.wp .page-community-code-of-conduct h4,.wp .page-community-code-of-conduct p{color:#101040}.wp .page-community-code-of-conduct h4{font-size:14px;position:relative;text-transform:uppercase }.wp .page-community-code-of-conduct h4:after{content:"";height:2px;width:40px;background:#257bd7;bottom:10px;left:0;position:absolute }.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2{font-size:36px;font-weight:400;line-height:48px;padding-top:30px }.wp .page-community-code-of-conduct a{color:#4197cb }.wp .page-community-code-of-conduct .coc-header-img img{width:100%;padding:0 80px;margin:0 auto;display:block;max-width:400px }.wp .page-community-code-of-conduct .coc-list{background:#f2f3f6;padding:30px 0 }.wp .page-community-code-of-conduct .coc-body h4,.wp .page-community-code-of-conduct .coc-body p{max-width:750px }.wp .page-community-code-of-conduct .coc-content{padding:30px 18px }.wp .page-community-code-of-conduct .coc-content h4{margin-bottom:30px } @media screen and (min-width:1000px){.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2{font-size:48px;line-height:55px;padding-top:40px }.wp .page-community-code-of-conduct .coc-header{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;padding:60px 18px }.wp .page-community-code-of-conduct .coc-header-content,.wp .page-community-code-of-conduct .coc-header-img{width:50% }.wp .page-community-code-of-conduct .coc-header-img img{padding:80px;margin:0;max-width:100% }.wp .page-community-code-of-conduct .coc-header p{max-width:425px } } @media screen and (min-width:1000px){.wp .page-community-code-of-conduct .coc-list{padding:60px 0 } } @media screen and (min-width:100px){.wp .page-community-code-of-conduct .coc-content{padding:60px 18px } }.wp .page-confluent-community-license-faq table{margin:20px 0;width:100% }.wp .page-confluent-community-license-faq table td,.wp .page-confluent-community-license-faq table th{padding:10px;vertical-align:top;border:1px solid #000 }.wp .page-confluent-community-license-faq table th{color:#c5832e;text-transform:uppercase }.wp .page-confluent-community-license-faq table td{width:50% }.wp .page-confluent-community-license-faq table tr.head td{background-color:#b4e1e4!important;color:#0074a2;text-transform:uppercase }.wp .page-confluent-community-license-faq table tbody tr:nth-child(2n) td{background-color:#e6f5fb }.wp .confluent-verified-integration-faqs-module--page--BYndC span{font-weight:400 }.wp .confluent-verified-integration-faqs-module--page--BYndC .confluent-verified-integration-faqs-module--faq--2vNyy{border-top:1px solid #eee;padding-top:40px }.wp .confluent-verified-integration-faqs-module--page--BYndC .confluent-verified-integration-faqs-module--faq--2vNyy ul li li{margin-bottom:0 }.cookies-module--container--30krb h3{text-align:center }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH{font-size:18px;border:1px solid #ccc;border-collapse:collapse;margin:0;padding:0;width:100%;table-layout:fixed }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(2n){background-color:#ecec;border:1px solid #ddd;padding:.35em }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(odd){background-color:#dcd8d8;border:1px solid #ddd;padding:2em }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(2n) td,.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(odd) td{border-right:1px solid #ddd;padding:10px;vertical-align:unset }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:first-child{background-color:#777373;border:1px solid #ddd;padding:.35em }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:first-child td{border-right:1px solid #ddd;padding:10px;color:#fff }.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH td:nth-of-type(3n) ul{margin-top:15px }.wp .page-template-industry-solutions-page .main\_banner{background:#b4e1e4 }.wp .page-template-industry-solutions-page .main\_banner p{font-weight:400;font-size:26px;max-width:800px;margin-left:auto;margin-right:auto;margin-top:20px;line-height:36px }.wp .page-template-industry-solutions-page .main\_banner .white\_outline\_button{background-color:#ff671f;border:2px solid #ff671f;padding:10px 50px }.wp .page-template-industry-solutions-page .featured\_use\_cases\_section h2{font-size:32px;font-weight:500 }.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_item{margin-top:20px }.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_inner{background-color:#fff;text-align:left;padding:20px

35px;font-size:16px}.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_item .uc\_inner h3{font-size:22px;font-weight:700;color:#4596ca}.wp .page-template-industry-solutions-page .cta\_section{padding:80px 0 90px;text-align:center;background-color:#f0f0f0}.wp .page-template-industry-solutions-page .cta\_section h2{font-size:48px;line-height:1.08;color:#2a323c}.wp .page-template-industry-solutions-page .cta\_section p{font-size:26px;line-height:1.23;color:#111820!important;margin-bottom:0;padding-bottom:0}.wp .page-template-industry-solutions-page .industry\_solution\_section h2{font-size:32px;font-weight:500}.wp .page-template-industry-solutions-page .solution\_categories{margin-top:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category{height:300px;background:#173361}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category:nth-child(2n){background:#0074a2}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active{opacity:1!important;overflow:visible}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active .cbp-item-wrapper{z-index:2}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active:after{content:"";display:block;position:absolute;left:50%;bottom:-30px;margin-left:-50px;border:50px solid transparent;border-bottom-color:#eff2f5;z-index:1}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category img{display:block;margin:0 auto 38px;width:auto}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .cbp-l-caption-title{font-size:26px;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .cbp-l-caption-desc{margin-top:35px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .white\_button{color:#4596ca;transition:inherit;background-color:#fff;border-radius:2px;font-size:16px;line-height:24px;padding:6px 25px;display:inline-block;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info{background-color:#eff2f5;padding:30px 35px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .desc h4{color:#4596ca;font-size:22px;line-height:normal;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item{margin-top:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item .solution\_item\_inner{background-color:#fff;padding:25px 25px 50px;position:relative;height:100%}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item h4{font-size:18px;font-weight:700;line-height:normal;padding:0;margin-bottom:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item .morelink{position:absolute;bottom:20px;left:25px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline{margin-bottom:60px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline .cbp-popup-content{margin-bottom:30px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline .cbp-popup-navigation{display:none}.wp .page-template-industry-solutions-page .desc h5{font-size:18px;font-weight:700}.wp .page-template-industry-solutions-page .desc ul{padding:0;list-style:none}.wp .page-template-industry-solutions-page .desc ul li{padding-left:20px;background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/li-style.png);background-repeat:no-repeat;background-position:left 10px}@media screen and (min-width:768px){.wp .page-template-industry-solutions-page .additional-resources-row{display:-ms-flexbox;display:flex}}.modern-slavery-policy-module--page--s\_47{text-align:left!important}.modern-slavery-policy-module--page--s\_47 h2{color:#333;font-size:30px;font-weight:400;line-height:36px;margin:0;padding:10px 0;text-align:center}.modern-slavery-policy-module--page--s\_47 h3{font-size:20px}.modern-slavery-policy-module--page--s\_47 ol{font-weight:300;line-height:1.78;color:#4a4a4a;font-size:18px}.wp .page-nominate .nomination .h3-border:after{content:"";height:2px;width:40px;background:#257bd7;margin-top:5px;display:block;position:relative}@media screen and (max-width:1000px){.wp .page-nominate .nomination .h3-border{text-align:center}.wp .page-nominate .nomination .h3-border:after{margin:5px auto 0}}.wp .page-nominate .nomination img{margin:0}.wp .page-nominate .nomination .row{display:-ms-flexbox;display:flex}@media screen and (max-width:1000px){.wp .page-nominate .nomination .row{margin-left:0;margin-right:0}}.wp .page-nominate .nomination h1,.wp .page-nominate .nomination h2{font-size:45px;line-

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height:61px;max-width:900px}.wp .page-nominate .nomination h3{font-size:16px!important;line-
height:21px!important;text-transform:uppercase}.wp .page-nominate .nomination__hero{padding-
top:100px;background:#257bd7}@media screen and (max-width:1000px){.wp .page-nominate .nomination__hero
.row{display:block}}.wp .page-nominate .nomination__hero h1,.wp .page-nominate .nomination__hero h2,.wp
.page-nominate .nomination__hero h3,.wp .page-nominate .nomination__hero p{color:#fff}@media screen and
(max-width:1000px){.wp .page-nominate .nomination__hero h1,.wp .page-nominate .nomination__hero h2,.wp
.page-nominate .nomination__hero h3,.wp .page-nominate .nomination__hero p{text-align:center}}.wp .page-
nominate .nomination__hero p{font-size:18px;line-height:27px;max-width:600px}@media screen and (max-
width:1000px){.wp .page-nominate .nomination__hero p{margin:0 auto}}.wp .page-nominate .nomination__hero
h3{color:#d8d8d8}.wp .page-nominate .nomination__hero .row{position:relative}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__hero .row{display:-ms-flexbox;display:flex}}@media screen and
(min-width:1000px){.wp .page-nominate .nomination__hero .half:first-child{width:60%;padding-
bottom:200px}}.wp .page-nominate .nomination__hero .half:last-child{margin:0 auto;width:50%}@media screen
and (min-width:1000px){.wp .page-nominate .nomination__hero .half:last-
child{position:absolute;right:0;bottom:0}}.wp .page-nominate
.nomination__pillars{background:#eeeff4;padding:60px 0}.wp .page-nominate .nomination__pillars .row{-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.wp .page-nominate
.nomination__pillars h3{margin-bottom:45px}.wp .page-nominate .nomination__pillars .nomination__pillar{text-
align:center;width:100%}.wp .page-nominate .nomination__pillars .nomination__pillar p{font-size:16px}.wp .page-
nominate .nomination__pillars .nomination__pillar img{max-width:90px}@media screen and (min-width:550px)
and (max-width:999px){.wp .page-nominate .nomination__pillars .nomination__pillar{width:50%}}@media screen
and (min-width:1000px){.wp .page-nominate .nomination__pillars .nomination__pillar{width:15%}}.wp .page-
nominate .nomination__pillars p{font-size:18px;line-height:27px;margin-top:20px}.wp .page-nominate
.nomination__content{background-repeat:repeat-x;background-position:bottom;background-
image:url(https://cdn.confluent.io/images/nominations/buildings-bg.png);margin-top:100px}@media screen and
(min-width:1200px){.wp .page-nominate .nomination__content{background-position:50%}}.wp .page-nominate
.nomination__content img{max-width:100%;width:auto}.wp .page-nominate .nomination__content p{font-
size:16px}.wp .page-nominate .nomination__content .row{position:relative;-ms-flex-wrap:wrap;flex-
wrap:wrap;text-align:center}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content
.row{text-align:left}}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .row:last-
child{margin-top:100px}}.wp .page-nominate .nomination__content .row:last-child .half:first-child{padding-
left:0}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .row:last-child .half:first-
child{margin-top:-75px}}.wp .page-nominate .nomination__content .image--right{display:none;margin-
top:40px;float:right}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .image--
right{display:block}}.wp .page-nominate .nomination__content .container{background-size:cover;background-
position:bottom;background-repeat:no-repeat;padding-bottom:50px;padding-top:100px}.wp .page-nominate
.nomination__content .container .half{width:100%}@media screen and (min-width:1000px){.wp .page-nominate
.nomination__content .container .half{width:46%}}.wp .page-nominate .nomination__content .container .half:first-
child{padding-left:30px}.wp .page-nominate .nomination__content .container .half:last-child{padding-
right:30px;margin-left:8%}}.wp .page-nominate
.nomination__form{background:#2a2e71;overflow:hidden;position:relative}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form{padding-bottom:150px}}.wp .page-nominate
.nomination__form:before{background-image:url(https://cdn.confluent.io/images/nominations/blue-
buildings.png);display:block;height:70%;width:685px;position:absolute;background-size:cover;z-
index:1;left:65%;background-repeat:no-repeat;bottom:250px}@media screen and (min-width:1000px){.wp .page-
nominate .nomination__form:before{content:""}}.wp .page-nominate .nomination__form .container{padding:100px
0 50px}.wp .page-nominate .nomination__form .container>div:first-child{width:100%}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form .container>div:first-child{width:60%}}.wp .page-nominate

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.nomination__form h2{padding-left:10px}.wp .page-nominate .nomination__form h2,.wp .page-nominate
.nomination__form h3,.wp .page-nominate .nomination__form h4,.wp .page-nominate .nomination__form
p{color:#fff}.wp .page-nominate .nomination__form p{font-size:18px;line-height:27px}.wp .page-nominate
.nomination__form label.error{color:red;position:absolute;top:0;margin:0;right:0;width:auto}.wp .page-nominate
.nomination__form-row{position:relative}.wp .page-nominate .nomination__form-row input,.wp .page-nominate
.nomination__form-row label,.wp .page-nominate .nomination__form-row
textarea{color:#afb0b3;display:block;width:100%}.wp .page-nominate .nomination__form-row label{letter-
spacing:1px;margin:20px 0 10px;text-transform:uppercase}.wp .page-nominate .nomination__form-row
textarea{min-height:250px;padding:15px}.wp .page-nominate .nomination__form-row input,.wp .page-nominate
.nomination__form-row textarea{background:transparent;border:1px solid #afb0b3}.wp .page-nominate
.nomination__form-row input[type=email],.wp .page-nominate .nomination__form-row input[type=text],.wp .page-
nominate .nomination__form-row textarea[type=email],.wp .page-nominate .nomination__form-row
textarea[type=text]{padding:17px}.wp .page-nominate .nomination__form-row--radio input,.wp .page-nominate
.nomination__form-row--radio label{display:inline;width:auto}.wp .page-nominate .nomination__form-row--radio
p{margin-top:15px;opacity:0;transition:opacity .6s}.wp .page-nominate .nomination__form-row--radio
input{margin-right:6px}.wp .page-nominate .nomination__form-row--radio label{margin-right:20px}.wp .page-
nominate .nomination__form-row--radio .isOver18{display:block}.wp .page-nominate .nomination__form-row--
control button{background:#257bd7;border-radius:50px;border:none;color:#fff;font-size:24px;line-
height:28px;margin-right:10px;margin-top:30px;min-width:260px;outline:none;padding:15px 20px;text-
align:center;-ms-transform:scale(1);transform:scale(1);transition:all .4s ease}.wp .page-nominate
.nomination__form-row--control button:hover{-ms-
transform:scale(1.025);transform:scale(1.025);background:#1e62ab}.wp .page-nominate .nomination__form-row--
control button.nomination__button--prev{background:none;border:1px solid #257bd7;color:#257bd7}@media
screen and (max-width:600px){.wp .page-nominate .nomination__form-row--control{text-align:center}.wp .page-
nominate .nomination__form-row--control button{display:block;font-size:18px;margin:15px auto;max-
width:60%}}.wp .page-nominate .nomination__form .swiper-pagination{bottom:0;left:50%;padding:14px
0;position:relative;-ms-transform:translateX(-50%);transform:translateX(-50%)}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form .swiper-pagination{bottom:10px;position:absolute}}.wp
.page-nominate .nomination__form .swiper-pagination-bullet{background:#d8d8d8;height:12px;margin:0
3px;opacity:1;width:12px}.wp .page-nominate .nomination__form .swiper-pagination-bullet-
active{background:#257bd7}.wp .page-nominate .nomination__form .swiper-slide{padding:10px}.wp .page-
nominate .nomination__form .swiper-slide fieldset{display:none}.wp .page-nominate .nomination__form .swiper-
slide:first-child fieldset{display:block}.wp .page-nominate .nomination__form .container{position:relative}.wp
.page-nominate .nomination__form img{bottom:-30px;right:-50%;max-width:450px;position:relative;-ms-
transform:translateX(-50%);transform:translateX(-50%);z-index:2}@media screen and (min-width:1000px){.wp
.page-nominate .nomination__form img{bottom:0;position:absolute;right:0;-ms-
transform:translateX(0);transform:translateX(0)}}.wp .page-nominate .nomination__form .thank-
you{display:none;padding:0 10px}@media screen and (min-width:1000px){.wp .page-nominate .nomination__form
.thank-you{margin-bottom:300px}}.wp .page-nominate .nomination .nomination-content{background-
color:#d61c50;padding:15px;color:#fff;text-align:center}.wp .page-nominate .nomination .nomination-
paragraph{margin:0 auto;color:#fff;font-size:16px;letter-spacing:.2px;width:70%;font-weight:400}@media screen
and (max-width:768px){.wp .page-nominate .nomination .nomination-paragraph{font-size:14px;width:90%}}.wp
.page-nominate .nomination .nomination__people{margin:20px 0}.wp .page-nominate .nomination
.nomination__people h2{max-width:none;text-align:center;margin:0;padding:0}.wp .page-nominate .nomination
.nomination__people img{border-radius:50%;width:112px;height:112px;border:1px solid #fff;-o-object-
fit:cover;object-fit:cover}.wp .page-nominate .nomination .nomination__people img.avatar{border-color:#ccc}.wp
.page-nominate .nomination .nomination__people .country-flag{width:25px;height:auto;-o-object-fit:contain;object-
fit:contain}.wp .page-nominate .nomination .nomination__people .container{display:-ms-flexbox;display:flex;-ms-

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flex-wrap:wrap;flex-wrap:wrap}.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:20%;margin:25px 0}.wp .page-nominate .nomination .nomination__people .container>div:nth-child(5n){margin-right:0}.wp .page-nominate .nomination .nomination__people .name{margin-top:5px}@media screen and (max-width:920px){.wp .page-nominate .nomination .nomination__people .container{-ms-flex-pack:center;justify-content:center}.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:30%}}@media screen and (max-width:540px){.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:40%}}@media screen and (max-width:360px){.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:100%}}.wp .previous-versions-module--container---YDGX td{height:auto}.sub-processors-module--page--2onUo table{border:1px solid #ccc;border-collapse:collapse;margin:0;padding:0;width:100%;table-layout:fixed;height:250px}.sub-processors-module--page--2onUo table thead tr{background-color:#dcd8d8;border:1px solid #ddd;padding:.35em}.sub-processors-module--page--2onUo table tbody tr{border:1px solid #ddd;padding:.35em}.sub-processors-module--page--2onUo table td{border-right:1px solid #ddd;padding:10px;height:24px;width:33.2969%}.wp .page-template-subscription .subscription-confluent-platform{margin-bottom:40px}.wp .page-template-subscription .sublist{font-family:MarkOT,sans-serif!important;font-size:16px!important;font-weight:300!important;line-height:24px!important;color:#4a4a4a!important}.wp .page-template-subscription .content-container{margin-left:40px}.style-module--container--2SjuF ul li{font-weight:300;line-height:1.78;color:#4a4a4a;font-size:18px}.style-module--container--2SjuF ul ul{margin:0}.wp .page-why-confluent .full-bleed-banner{background-image:url(https://cdn.confluent.io/wp-content/uploads/hero-image.png);background-size:cover;background-position:50%;padding:60px 0;text-align:center}@media only screen and (min-width:480px){.wp .page-why-confluent .full-bleed-banner{padding:90px 0}}@media only screen and (min-width:540px){.wp .page-why-confluent .full-bleed-banner{padding:120px 0}}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner{padding:250px 0}}.wp .page-why-confluent .full-bleed-banner__subtitle{color:#fff;font-size:18px;line-height:24px;font-weight:400;text-transform:uppercase}.wp .page-why-confluent .full-bleed-banner h1{color:#fff;font-size:60px;line-height:80px;font-weight:700}.wp .page-why-confluent .full-bleed-banner__buttons{position:relative;margin:12px auto 0}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons{-ms-flex-align:start;align-items:flex-start;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}}.wp .page-why-confluent .full-bleed-banner__buttons a{border-radius:8px;font-size:14px;display:block;line-height:14px;margin:0 auto 18px;opacity:1;padding:18px 42px;text-transform:uppercase;transition:opacity .3s ease;width:-webkit-max-content;width:-moz-max-content;width:max-content}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons a{display:inline-block;margin:0}}.wp .page-why-confluent .full-bleed-banner__buttons a:hover{opacity:.75}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons a+a{margin-left:18px}}.wp .page-why-confluent .full-bleed-banner__buttons a:first-child{background-color:#fff;color:#637fed}.wp .page-why-confluent .full-bleed-banner__buttons a:last-child{border:1px solid #fff;background-color:transparent;color:#fff;margin-bottom:0}.wp .page-why-confluent .schema-registry{overflow-x:hidden}.page-template-customers .bg-grey{display:block;z-index:1;opacity:1}.page-template-customers .swiper-wrapper{height:auto!important}.page-template-customers .featured-stories{background-image:linear-gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .featured-stories.bg-grey,.page-template-customers .featured-stories.bg-white{background-image:none!important}.page-template-customers .featured-stories.bg-grey{background-color:#fafafa!important}.page-template-customers .featured-stories__stories{margin-top:48px}@media screen and (min-width:768px){.page-template-customers .featured-stories__stories{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-wrap:wrap;flex-wrap:wrap}}.page-template-customers .featured-stories__story{background-color:#fff;border:1px solid #ddd;border-radius:10px;display:block;margin-bottom:30px;padding:30px;position:relative;text-align:left}@media screen and (min-width:768px){.page-template-customers .featured-stories__story{margin:1%;width:48%}}@media screen and (min-width:992px){.page-template-customers .featured-stories__story{width:31%}}.page-template-customers .featured-stories__story [data-mh=story-

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image]{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;margin-bottom:12px }.page-template-customers .featured-stories__story [data-mh=story-image]
img{margin:0}.page-template-customers .featured-stories__story h3{color:#4a4a4a;font-size:24px;font-
weight:700;line-height:30px;margin-bottom:12px }.page-template-customers .featured-
stories__story h3 a{color:#4597cb;margin-top:0}.page-template-customers .featured-stories__story h3 a:hover{text-
decoration:none }.page-template-customers .featured-stories__story p{color:#8b8d90;font-size:16px;font-
weight:400;line-height:28px;margin-bottom:0}.page-template-customers .featured-stories__story
a{display:block;margin-top:24px}.page-template-customers .featured-stories__story a img{margin-left:0}.page-
template-customers .featured-stories__story .icon-container{display:inline-block;vertical-align:middle;margin-
right:10px}.page-template-customers .featured-stories__bubbles {margin-top:30px}@media screen and (min-
width:768px){.page-template-customers .featured-stories__bubbles{-ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-
content:center}}.page-template-customers .featured-stories__bubble{-ms-flex-align:center;align-
items:center;background:#fff;border-radius:50%;display:-ms-flexbox;display:flex;height:160px;margin:0 auto
30px;padding:18px;position:relative;width:160px}@media screen and (min-width:768px){.page-template-
customers .featured-stories__bubble{margin:0 12px 30px}}.page-template-customers .featured-stories__bubble
div{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;position:relative;text-align:center;width:100%}.page-template-customers .featured-stories__bubble
img{margin:0}.page-template-customers .featured-stories__bubble span{display:block!important}.page-template-
customers .image-text-carousel{background-image:linear-
gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .image-text-carousel.bg-
grey,.page-template-customers .image-text-carousel.bg-white{background-image:none!important}.page-template-
customers .image-text-carousel.bg-grey{background-color:#fafafa!important}.page-template-customers .image-text-
carousel .container{position:relative}.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content{margin:0 auto;padding:0 60px;position:relative;text-align:left}.page-template-customers .image-
text-carousel .swiper-container .swiper-slide__content>div:first-child{margin-bottom:24px}@media screen and
(min-width:768px){.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}.page-
template-customers .image-text-carousel .swiper-container .swiper-slide__content>div:first-child{margin-
bottom:0;padding:0 30px;width:40%}.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content>div:last-child{width:60%}}.page-template-customers .image-text-carousel .swiper-container
.swiper-slide__content img{margin:0;padding:0}.page-template-customers .image-text-carousel .swiper-container
.swiper-slide__content h3{color:#4a4a4a;font-size:24px;font-weight:700;line-height:38px;margin-top:0;padding-
top:0}.page-template-customers .image-text-carousel .swiper-container .swiper-slide__content
p{color:#4a4a4a;font-size:16px;line-height:32px}.page-template-customers .image-text-carousel .swiper-button-
next,.page-template-customers .image-text-carousel .swiper-button-prev{background-image:none;border-
bottom:4px solid #8b8d90;border-left:4px solid #8b8d90;height:30px;width:30px;-ms-
transform:rotate(45deg);transform:rotate(45deg)}.page-template-customers .image-text-carousel .swiper-button-
next{-ms-transform:rotate(-135deg);transform:rotate(-135deg)}.page-template-customers .image-text-carousel
.swiper-pagination{margin-top:30px;position:relative}.page-template-customers .image-text-carousel .swiper-
pagination .swiper-pagination-bullet{background-color:transparent;border:1px solid #8b8d90;height:9px;margin:0
9px;opacity:1;width:9px}.page-template-customers .image-text-carousel .swiper-pagination .swiper-pagination-
bullet-active{background-color:#8b8d90}.page-template-customers .section.hero_overview.hero-
section{padding:90px 0 30px!important}@media screen and (max-width:800px){.page-template-customers
.section.hero_overview.hero-section{padding:60px 0 30px!important}}.page-template-customers .cc-featured-table-
header{padding:30px 0;position:relative}.page-template-customers .cc-featured-table-
header:before{content:"";display:block;width:100%;height:1px;border-top:1px solid
#dce0e4;position:absolute;left:0;bottom:0}.page-template-customers .license-table{background:#fff;padding:0 0

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90px;position:relative}.page-template-customers .license-table p{font-size:16px}.page-template-customers .license-table h4{color:#8e9093;font-size:18px;font-weight:600;line-height:28px;padding:0}.page-template-customers .license-table hr{margin-top:20px}.page-template-customers .license-table ul{margin-bottom:30px}.page-template-customers .license-table ul ul{margin-top:18px;padding-left:24px}.page-template-customers .license-table li{color:#8e9093;margin-bottom:20px;font-weight:300}.page-template-customers .license-table .row{box-shadow:none;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.page-template-customers .half{padding:30px}.page-template-customers .half #download-cloud-half-button{background-color:rgba(74,148,214,.85);background-image:radial-gradient(ellipse farthest-corner at -40% 260%,#4a94d6 0,rgba(49,109,194,0) 80%,#4e95d3 0),linear-gradient(258deg,rgba(87,238,255,.1),rgba(77,108,211,0));border-radius:50px;box-shadow:none;color:#fff;display:inline-block;min-width:360px;padding:16px 20px 16px 65px;position:relative;text-align:left;text-decoration:none}.page-template-customers .half #download-cloud-half-button:before{content:"";background-repeat:no-repeat;background-size:contain;width:40px;height:40px;position:absolute;left:20px;top:28px;transition:all .1s ease-in}.page-template-customers .tabs-stage{padding-bottom:60px;box-shadow:0 0 30px 0 rgba(57,84,109,.14)}.page-template-customers .license-table.test-2 .row{border:none;box-shadow:none;padding:0}.page-template-customers .license-table .layout-break{margin:-35px 0 35px;font-size:36px;line-height:46px}.page-template-customers .line-dot-right:before{width:calc(100% - 60px)}.page-template-customers .line-dot-right:after{right:50px}.page-template-customers .test-2 .container h2+div>h3{color:#8e9093;font-size:16px;font-weight:300;letter-spacing:2px;line-height:2;text-transform:uppercase}@media screen and (min-width:800px){.page-template-customers .half{width:49.9%}.page-template-customers .license-table .row{-ms-flex-wrap:nowrap;flex-wrap:nowrap}}.page-template-customers .skinny{padding-top:90px}.page-template-customers .skinny h2{color:#8e9093;font-size:32px;line-height:52px;font-weight:300}.page-template-customers .skinny p{color:#4698cb;font-size:16px}.page-template-customers .skinny img{opacity:.1;margin:0 0 10px}.page-template-customers .featured-table+.featured-table{margin-top:90px}.page-template-customers .featured-table table{width:100%}.page-template-customers .featured-table h3{color:#4a4a4a;font-size:24px;line-height:38px;letter-spacing:.7px;text-transform:none}.page-template-customers .featured-table h3+ul{color:#8e9093;font-weight:300;list-style:none;padding:0}.page-template-customers .featured-table h3+ul li{padding:0 6px!important}.page-template-customers .featured-table .gs-tooltip,.page-template-customers .featured-table h4{padding:17px}.page-template-customers .gs-tooltip>p,.page-template-customers td>p{color:#4a4a4a}@media screen and (max-width:800px){.page-template-customers .gs-tooltip>p,.page-template-customers td>p{font-size:12px!important}}.page-template-customers .table-dot{background:#4698cb;border-radius:30px;height:15px;margin:0 auto;text-align:center;width:15px}.page-template-customers .featured-table h4{font-size:12px;line-height:32px;letter-spacing:2px;text-transform:uppercase;color:#8e9093}.page-template-customers .thead-no-background h3{font-weight:600;margin:0;padding-top:60px}@media screen and (max-width:800px){.page-template-customers .thead-no-background h3{font-size:18px!important}}@media screen and (max-width:800px){.page-template-customers .thead-no-background h4{font-size:10px!important;padding:10px 0}}.page-template-customers .featured-table .tr-heading{background:#fafafa}.page-template-customers .no-border{border:none!important}.page-template-customers .featured-table table+table tbody tr{border-bottom:1px solid rgba(0,0,0,.1)}.page-template-customers .featured-table table tbody td:first-child{width:50%}.page-template-customers section.three-col-media-blocks{text-align:left;padding:0}.page-template-customers section.three-col-media-blocks section.three-col-media-blocks img{opacity:.3}.page-template-customers section.three-col-media-blocks p{margin:10px 0 20px}.page-template-customers section.three-col-media-blocks a{font-size:18px}.page-template-customers section.three-col-media-blocks li div:first-child{display:block}.page-template-customers section.three-col-media-blocks li div img{margin:0;max-width:120px}.page-template-customers .cta-links-section{padding-top:0}.page-template-customers .cta-links-section h4{font-weight:500}.page-template-customers .cta-links-section\_\_title{color:#8e9093;font-size:12px;letter-spacing:3px;text-transform:uppercase}@media screen and (max-width:800px){.page-template-customers .cta-links-section .col-12{margin-bottom:30px}}.page-template-

customers .three-col-media-blocks .intro-title{max-width:100% }.page-template-customers .three-col-media-blocks .intro-title h2{margin:25px 0;padding-bottom:45px;position:relative;text-align:left;width:100% }.page-template-customers .three-col-media-blocks .intro-title h2:before{content:"";display:block;width:calc(100% - 10px);height:1px;border:2.5px solid #dce0e4;position:absolute;left:0;bottom:0;border-radius:5px }.page-template-customers .three-col-media-blocks .intro-title h2:after{content:"";display:block;width:1px;height:1px;border:2.5px solid #dce0e4;position:absolute;right:0;bottom:0;border-radius:5px }.page-template-customers .download\_white h5{color:#4597cb!important }.page-template-customers #download\_cp\_cc\_\_cloud tr td .gs-tooltip{text-align:center }.page-template-customers #download\_cp\_cc\_\_cloud tr td:first-child .gs-tooltip{text-align:left }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table tbody tr{border-bottom:1px dashed #d3d0d0 }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table tbody td:first-child{width:30% }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .rounded\_button,.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td button{background:#4597cb;border-radius:50px;border:2px solid transparent;color:#fff;display:block;font-size:14px;font-weight:500;letter-spacing:2px;margin:0 auto;max-width:160px;min-width:0;min-width:160px;padding:12px 0 11px;position:relative;text-align:center;text-transform:uppercase;transition:background .35s ease-out,color .35s ease-out;white-space:nowrap } @media screen and (max-width:768px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .rounded\_button,.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td button{font-size:11px;min-width:110px;max-width:110px;margin-left:auto!important } }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .chart-cta-links{color:#5996c6;display:block;margin-top:30px;text-decoration:underline;font-weight:300 } @media screen and (max-width:768px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .chart-cta-links{font-size:11px;min-width:110px;max-width:110px;margin-left:auto!important } } @media screen and (max-width:480px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td{min-width:0;max-width:none;display:table-cell } }.page-template-customers .rounded\_button{position:relative;display:inline-block;text-decoration:none;border-radius:50px;box-shadow:2px 3px 6px 0 rgba(0,0,0,.25);box-shadow:none;min-width:360px;max-width:370px;text-align:left;font-size:18px }.page-template-customers .rounded\_button.simple\_blue,.page-template-customers .rounded\_button.simple\_white{border:2px solid #4a94d6 }.page-template-customers .download\_blue-c3{background-image:radial-gradient(ellipse farthest-corner at -40% 260%,#4a94d6 0,rgba(49,109,194,0) 80%,#4e95d3 0),linear-gradient(258deg,rgba(87,238,255,.1),rgba(77,108,211,0));background-color:rgba(74,148,214,.85);color:#fff;padding:16px 20px 16px 65px }.page-template-customers .no-icon:before{background-image:none!important }.page-template-customers .rounded\_button h5{display:block;padding:0;opacity:.99;font-family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-spacing:.7px;text-align:left;color:#fff }.page-template-customers .global\_\_breadcrumbs{font-size:12px;margin-bottom:60px }.page-template-customers .global\_\_breadcrumbs ul{margin:auto;list-style:none;overflow:hidden;position:static }.page-template-customers .global\_\_breadcrumbs li{float:left }.page-template-customers .global\_\_breadcrumbs li a{font-weight:300 }.page-template-customers .global\_\_breadcrumbs li:after{color:#4698cb;content:">";padding:6px }.page-template-customers .global\_\_breadcrumbs li:last-child:after{content:"" }.page-template-customers .download\_blue-c3:before{content:"";background-repeat:no-repeat;background-size:contain;width:40px;height:40px;position:absolute;left:20px;top:28px;transition:all .1s ease-in }.page-template-customers .single--text:before{width:30px;height:30px;top:20px }.page-template-customers .download\_blue-simple{position:relative;width:240px;height:45px;padding:0;line-height:54px;margin-right:17px;background-color:#4597cb;color:#fff;border:3px solid #4597cb;border-radius:7.5px;opacity:.99;font-size:18px;font-weight:700;letter-spacing:1px;transition:all .3s ease;display:inline-block;text-align:center;white-space:nowrap;vertical-align:middle;cursor:pointer;background-image:none;text-decoration:none!important;margin-top:15px;margin-bottom:25px }.page-template-customers .cta-text-block h2{margin-bottom:60px }.page-template-customers .download\_blue-simple h5{color:#fff;text-decoration:none!important;padding:5px 15px;font-

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size:16px}.page-template-customers .paper_white-c3{margin-left:15px;position:relative;display:inline-block;min-
width:360px;text-align:left;font-size:18px;text-decoration:none!important;border-radius:50px;background-
color:#fff;color:#4a94d6;padding:17px 21px 16px 70px;outline:0;transition:all .4s ease-in-out;border:3px solid
#4698cb}.page-template-customers .paper_white-c3 h5{display:block;padding:0;opacity:.99;font-
family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-
spacing:.7px;text-align:left;color:#4a94d6}.page-template-customers .paper_white-
c3:before{content:"";background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/paper_white_link_icon.png);background-repeat:no-repeat;background-
size:contain;width:51px;height:51px;position:absolute;left:13px}.page-template-customers .download_blue-c3
span,.page-template-customers .paper_white-c3 span{display:block;font-size:15px;line-height:20px}.page-template-
customers .c3-video_container a.play_btn{background-
size:contain;position:absolute;content:"play";display:block;width:21%;height:30%;text-align:left;text-indent:-
9999px;background-repeat:no-repeat;background-size:cover;top:40%;right:50%;margin-top:-41px;margin-left:-
34px}.page-template-customers .imagefullright .col-sm-3{position:absolute;left:66.66%;right:calc(-50% +
300px);padding:0;width:50%;text-align:left;left:64%}.page-template-customers .imagefullright img{margin-top:-
55px}.page-template-customers .hero-section .col-sm-8{position:relative;z-index:1}.page-template-customers .hero-
section h1{margin-bottom:30px;padding-bottom:0;line-height:70px}@media only screen and (max-
width:767px){.page-template-customers .hero-section h1 br{display:none}}.page-template-customers .hero-section
.cta-wrap{padding-top:35px}.page-template-customers .hero-section--border{border-bottom:1px solid
#e6e6e6}.page-template-customers .hero-section p{color:#4a4a4a;line-height:32px!important;max-
width:760px;letter-spacing:.2px;font-size:21px;width:700px}.page-template-customers
.section.hero_overview{overflow-x:hidden;overflow:hidden;padding:120px 0 30px;text-align:left}@media only
screen and (min-width:768px){.page-template-customers .section.hero_overview{padding:120px 0}}.page-
template-customers .testimonial-section{padding-top:119px;padding-bottom:120px}.page-template-customers
.testimonial-section-block{padding-right:21px;padding-left:21px;margin-right:auto;margin-left:auto}.page-
template-customers .cta-text-section{padding-top:50px;padding-bottom:60px;background-color:#fafafa}.page-
template-customers .cta-text-gradient{padding-top:50px;padding-bottom:60px;background-color:#fff;background-
image:linear-gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .cta-text-
white{padding-top:50px;padding-bottom:60px}.page-template-customers .cta-text-block{padding-
right:21px;padding-left:21px;margin-right:auto;margin-left:auto}.page-template-customers .cta-text-block
img{width:150px}.page-template-customers .intro-title{margin:auto}.page-template-customers .intro-title h2{font-
weight:300;color:#8e9093;text-align:center;font-size:3.6rem;line-height:52px}.page-template-customers .intro-title
p{margin-top:0;text-align:center}.page-template-customers .quote-customer-name{font-size:16px!important;text-
align:center;line-height:2!important;color:#ff671b;text-transform:uppercase;padding:0;letter-spacing:2px;font-
weight:400}.page-template-customers .quote-customer-desination{font-size:16px!important;text-align:center;line-
height:2!important;color:#4a4a4a;padding:0;letter-spacing:.2px;font-weight:300}.page-template-customers .bottom-
cta{background-color:#fafafa;overflow:hidden;padding:50px 0}.page-template-customers .bottom-cta
.container{padding:90px 15px;position:relative}.page-template-customers .bottom-cta h2{margin-
bottom:30px}@media only screen and (max-width:767px){.page-template-customers .bottom-cta h2
br{display:none}}.page-template-customers .bottom-cta
.container:before{content:"";display:block;width:200%;height:50%;background-color:#fff;border-radius:500px 0 0
0;position:absolute;top:0;left:-10%}.page-template-customers .bottom-cta
.container:after{content:"";display:block;width:200%;height:50%;background-color:#fff;border-radius:0 0 0
500px;position:absolute;bottom:0;left:-10%}.page-template-customers .bottom-cta .container .text-
wrap{position:relative;z-index:1}.page-template-customers .learn-to-love p,.page-template-customers .section-text
p{font-weight:300;line-height:2;color:#4a4a4a;font-size:16px}.page-template-customers .learn-to-love p{font-
family:Roboto;font-style:normal;font-stretch:normal;letter-spacing:.2px;text-align:left;padding-top:7px;margin-
bottom:48px}.page-template-customers .cta-links-section{background:#fafafa;padding:80px 0}.page-template-

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customers .cta-anchors{padding-right:60px;display:block;font-weight:300;line-height:32px}.page-template-customers .transition-c3 p:nth-child(6){margin-bottom:0}.page-template-customers .section-text\_\_left p,.page-template-customers .section-text\_\_right p{font-family:Roboto;font-size:16px;font-weight:300;font-style:normal;font-stretch:normal;line-height:2;letter-spacing:.2px;text-align:left;color:#4a4a4a;padding-bottom:10px;padding-top:8px}.page-template-customers .section-text\_\_right h3,.page-template-customers .section-text\_\_right p,.page-template-customers .section-text\_\_right ul{padding-left:110px}.page-template-customers .section-text\_\_left h3,.page-template-customers .section-text\_\_left p{padding-right:110px}.page-template-customers .section-text\_\_left h3,.page-template-customers .section-text\_\_right h3{width:90%;opacity:.99;font-family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-spacing:.7px;text-align:left;color:#4a4a4a;padding-top:60px}.page-template-customers .section-text\_\_right a{padding-left:110px}.page-template-customers .section-img\_\_left img{padding-top:150px}.page-template-customers .section-img\_\_left\_No img{padding-top:125px}.page-template-customers .section-img\_\_right img{padding-top:110px}.page-template-customers .c3\_specific\_content p{padding-top:8px}.page-template-customers .c3\_specific\_content{background-color:#fafafa;padding-top:90px;padding-bottom:35px}.page-template-customers .image-text-section{background-color:#fff;background-image:linear-gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08));padding-top:120px;padding-bottom:89px}.page-template-customers .image-text-section ul{margin-top:-20px;font-weight:300}.page-template-customers .image-text-section ul li{color:#4a4a4a}@media screen and (min-width:768px){.page-template-customers .image-text-section .section-text\_\_right ul{margin-left:35px}}@media screen and (max-width:767px){.page-template-customers .image-text-section .section-text\_\_right ul{padding-left:40px}}.page-template-customers .image-animation-1,.page-template-customers .image-animation-2,.page-template-customers .image-animation-3{position:relative;margin-top:25px}.page-template-customers .image-animation-1{display:block}.page-template-customers .img-section-title{width:264px;font-family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.58;letter-spacing:.7px;text-align:left;color:#4698cb;padding:0}.page-template-customers .main\_banner{padding:90px 0 100px}.page-template-customers .faq\_intro p{max-width:90%;color:#4a4a4a;font-size:18px}.page-template-customers .faq\_content{max-width:90%!important}.page-template-customers .certificate\_faq\_section p{max-width:none}.page-template-customers .image-animation-1,.page-template-customers .image-animation-2{display:none}.page-template-customers .form\_style{padding-left:320px;padding-top:25px}.page-template-customers .form\_style\_media{padding-left:20px;padding-top:25px}@media screen and (max-width:990px){.page-template-customers .form\_style{padding-left:65px}.page-template-customers .form\_style\_media{padding-left:0}}@media screen and (min-width:1450px){.page-template-customers .imagefullright .col-sm-3 img{margin:-55px 0 0;max-width:750px}.page-template-customers .c3-video\_container a.play\_btn{width:120px;height:120px;right:0;left:30%;top:45%}}@media screen and (max-width:991px){.page-template-customers .c3-video\_container a.play\_btn{width:90px;height:90px;top:40%;left:40%}}@media screen and (max-width:767px){.page-template-customers .c3-video\_container a.play\_btn{width:80px;height:80px;top:50%;left:50%}}.page-template-customers .imagefullright .col-sm-3 img{display:block;margin:20px auto 0}.page-template-customers .imagefullright .col-sm-3{position:relative!important;left:0!important;right:0!important;padding:15px!important;width:100%!important}.page-template-customers .section-text\_\_left h3,.page-template-customers .section-text\_\_left p{padding-right:10px!important}.page-template-customers .transition-c3{padding-bottom:55px}}@media screen and (max-width:1199px){.page-template-customers .paper\_white-c3{margin-left:0!important;margin-top:20px}.page-template-customers .download\_blue-c3{margin-bottom:10px}.page-template-customers .section-text\_\_right a,.page-template-customers .section-text\_\_right h3,.page-template-customers .section-text\_\_right p,.page-template-customers .section-text\_\_right ul{padding-left:10px}}@media screen and (max-width:767px){.page-template-customers .section-img\_\_left\_No img,.page-template-customers .section-img\_\_left img{padding-top:25px!important}.page-template-customers .section-text\_\_right a,.page-template-customers .section-text\_\_right h3,.page-template-customers .section-text\_\_right p{padding-left:10px!important}.page-template-customers .section-img\_\_right img{padding-top:20px!important}}@media screen and (max-width:480px){.page-template-customers

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.download_blue-c3 h5,.page-template-customers .paper_white-c3 h5{ font-size:18px!important} .page-template-
customers .c3_specific_content .image-animation{ margin-top:100px} @media only screen and (max-
width:767px){ .page-template-customers .c3_specific_content .image-animation{ margin-top:10px} .page-template-
customers .animation_specific_content{ padding-bottom:25px} .page-template-customers .bottom-cta p{ margin-
top:-80px} .page-template-customers .animation_specific_content{ padding-bottom:110px} .page-template-customers
.desktop-only{ display:none} @media screen and (min-width:800px){ .page-template-customers .desktop-
only{ display:block} } .page-template-customers .cc-featured-table-header h2{ font-size:38px!important;text-
align:center;text-transform:capitalize!important} .page-template-customers #tab-2 .rounded_button{ margin:30px
auto!important} .page-template-customers #tab-2 h3{ font-size:28px!important;text-align:center;margin-
bottom:50px} .page-template-customers #tab-2 .pricing-check-list{ max-width:850px;margin:0 auto} .page-template-
customers #tab-2 .pricing-check-list li{ font-size:20px;width:100%;margin-bottom:20px} @media screen and (min-
width:1000px){ .page-template-customers #tab-2 .pricing-check-list li{ width:50%;padding-left:30px;text-
align:left;margin-bottom:50px} } .page-template-customers #view-pricing .container{ background:#fff;box-shadow:0
0 10px 3px rgba(0,0,0,.1)} @media screen and (max-width:768px){ .page-template-customers #view-pricing
.container{ width:100%} } @media screen and (min-width:1000px){ .page-template-customers #view-pricing
.container{ padding:0 50px} } .page-template-customers .pricing-table{ position:relative} @media screen and (max-
width:1000px){ .page-template-customers .pricing-table{ padding-bottom:0} } @media screen and (min-
width:750px){ .page-template-customers .pricing-
table:after{ background:#f2f3f6;content:"";height:250px;left:0;position:absolute;top:0;width:100%;z-index:-
1} } .page-template-customers .pricing-table .rounded_button{ background:#4597cb;border:2px solid
#4597cb;color:#fff;display:block;font-size:14px;max-width:160px;min-width:160px;padding:10px;text-
align:center;text-transform:uppercase;width:50%;transition:all .3s ease} .page-template-customers .pricing-table
.rounded_button--outline,.page-template-customers .pricing-table
.rounded_button:hover{ background:#fff;border:2px solid #4597cb;color:#4597cb} .page-template-customers
.pricing-table .rounded_button--outline:hover{ background:#4597cb;color:#fff} .page-template-customers .pricing-
table .pricing-ctas{ margin:0 auto;width:auto;padding:60px 0 40px;display:block} @media screen and (min-
width:800px){ .page-template-customers .pricing-table .pricing-ctas{ display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center} } .page-template-customers .pricing-table
.pricing-ctas .rounded_button{ margin:10px auto!important} @media screen and (min-width:800px){ .page-template-
customers .pricing-table .pricing-ctas .rounded_button{ margin:10px!important} } .page-template-customers .pricing-
table .pricing-ctas p{ margin:30px 0;text-decoration:underline;text-align:center;width:100%} .page-template-
customers .pricing-table .row{ display:-ms-flexbox;display:flex;margin:0 0 6px} .page-template-customers .pricing-
table .row-total h3{ position:relative} .page-template-customers .pricing-table .row-total h3:before{ border-top:1px
solid #979797;width:250px;position:absolute;content:"";height:1px;top:-16px;left:0} .page-template-customers
.pricing-table ul.tabs{ display:block;list-style:none;margin:0 auto;padding:0;position:relative;z-index:1} @media
screen and (min-width:800px){ .page-template-customers .pricing-table ul.tabs{-ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center} } .page-template-
customers .pricing-table ul.tabs:before{ border-top:1px solid
#e6e6e6;content:"";position:absolute;top:50%;width:100%;height:1px;left:0;z-index:-1} .page-template-customers
.pricing-table ul.tabs li{ border:1px solid #e6e6e6;background:#fff;display:block;font-size:14px;padding:20px
30px;text-align:center;min-width:310px;cursor:pointer} .page-template-customers .pricing-table ul.tabs li
span{ display:block;font-size:16px} .page-template-customers .pricing-table .tab-link:first-child{ border-radius:5px
5px 0 0;border-bottom:none} .page-template-customers .pricing-table .tab-link:nth-child(2){ border-radius:0 0 5px
5px;border-top:none} @media screen and (min-width:800px){ .page-template-customers .pricing-table .tab-link:first-
child{ border-radius:5px 0 0 5px;border-bottom:1px solid #e6e6e6;border-color:#e6e6e6 currentcolor;border-
right:none} .page-template-customers .pricing-table .tab-link:first-child.current{ border-color:#5781e9} .page-
template-customers .pricing-table .tab-link:nth-child(2){ border-radius:0 5px 5px 0;border-color:currentcolor
#e6e6e6 #e6e6e6;border-top:1px solid #e6e6e6;border-left:none} .page-template-customers .pricing-table .tab-

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link:nth-child(2).current{border-color:#5781e9}.page-template-customers .pricing-table ul.tabs
li.current{border:1px solid #5781e9;background:#5781e9;color:#fff}.page-template-customers .pricing-table .tab-
content{display:none;padding:15px}.page-template-customers .pricing-table .tab-
content.current{display:inherit}.page-template-customers .pricing-table .pricing-check-list{margin-
bottom:30px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;padding:0;-ms-flex-
pack:center;justify-content:center}.page-template-customers .pricing-table .pricing-check-list
.icon.check{display:inline-block;margin-right:15px;height:15px;width:15px}.page-template-customers .pricing-
table .pricing-check-list ul{padding:0;text-align:center}.page-template-customers .pricing-table .pricing-check-list
li{display:block;list-style:none;text-align:center;width:100%}@media screen and (min-width:1000px){.page-
template-customers .pricing-table .pricing-check-list li{text-align:left;width:50%}}@media screen and (min-
width:1200px){.page-template-customers .pricing-table .pricing-check-list li{text-align:center;width:25%}}@media
screen and (max-width:850px){.page-template-customers .pricing-table .pricing-check-list li{margin-
bottom:8px}.page-template-customers .pricing-table .pricing-check-list li+li{margin-left:0}}.page-template-
customers .pricing-table .intro-title{margin:0 auto;padding:30px 0}.page-template-customers .pricing-table .intro-
title h2{color:#101040;margin-bottom:30px}.page-template-customers .pricing-table h3{color:#101040;font-
size:22px!important;font-weight:700}@media screen and (max-width:850px){.page-template-customers .pricing-
table h3{font-size:16px!important}}.page-template-customers .pricing-table h4{font-size:18px!important;font-
weight:700}@media screen and (max-width:850px){.page-template-customers .pricing-table h4{font-
size:14px!important}}.page-template-customers .pricing-table p{color:#101040;font-size:16px;line-
height:2}@media screen and (max-width:850px){.page-template-customers .pricing-table p{font-size:12px}}.page-
template-customers .pricing-table .col-sm-4{background:#fafafa;width:33%}.page-template-customers .pricing-
table .col-sm-4:first-child{background:#fff;border-bottom:1px solid #e6e6e6;-ms-flex-pack:start;justify-
content:flex-start}.page-template-customers .pricing-table .col-sm-4:first-child h3{font-size:18px!important}.page-
template-customers .pricing-table .col-sm-4 img{display:block;margin:0 auto;max-width:100px}.page-template-
customers .pricing-table .pricing-example-container{border:8px solid #fafafa;border-top:30px solid
#fafafa}@media screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-example-
container{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}}.page-template-customers
.pricing-table .pricing-example-container .pricing-example{margin:0 auto;width:95%}.page-template-customers
.pricing-table .pricing-example-container .pricing-example:first-child{border-bottom:1px solid #979797}@media
screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-example-container .pricing-
example{margin:0;width:50%}.page-template-customers .pricing-table .pricing-example-container .pricing-
example:first-child{border-bottom:none}}.page-template-customers .pricing-table .pricing-example-container
.pricing-example .cluster{-ms-flex-align:start;align-items:flex-start;-ms-flex-pack:start;justify-content:flex-
start;padding:14px 34px}@media screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster{min-height:120px}}.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster img{margin-top:12px}.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster h3{font-size:18px!important}.page-template-customers .pricing-table
.pricing-example-container .pricing-example .cluster h4{font-size:14px!important;padding:0}.page-template-
customers .pricing-table .pricing-example-container .pricing-example .cluster p{font-size:14px}.page-template-
customers .pricing-table .pricing-example-container .pricing-example .cluster p span{font-size:18px}.page-
template-customers .pricing-table .top-row{border-top:1px solid #e6e6e6}.page-template-customers .pricing-table
.flex-row{-ms-flex-pack:justify;justify-content:space-between}.page-template-customers .pricing-table .flex-row
.light{font-weight:400}.page-template-customers .pricing-table .flex-row div{width:50%}.page-template-customers
.pricing-table .flex-row div h3,.page-template-customers .pricing-table .flex-row div h4,.page-template-customers
.pricing-table .flex-row div p{margin:0;padding:0}.page-template-customers .pricing-table .flex-row div+div{text-
align:right}.page-template-customers .pricing-table .flex-row.grey-bg{background-color:#fafafa}.page-template-
customers .pricing-table .darkgrey-bg{background-color:#eeff4}.page-template-customers .pricing-table .border-
bottom{border-bottom:2px solid #e6e6e6}.page-template-customers .pricing-table .push-top{margin-

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top:65px }.page-template-customers .pricing-table .cluster,.page-template-customers .pricing-table .options,.page-
template-customers .pricing-table .title{margin:0 0 0 6px;padding:27px 34px }.page-template-customers .pricing-
table .cluster:first-child,.page-template-customers .pricing-table .options:first-child,.page-template-customers
.pricing-table .title:first-child{margin-left:0 }.page-template-customers .pricing-table .cluster{-ms-flex-
align:center;align-items:center;border-left:0;border-right:0;display:-ms-flexbox;display:flex;-ms-flex-
pack:center;justify-content:center }.page-template-customers .pricing-table .cluster img{margin:0 20px 0 0;max-
width:35px }.page-template-customers .pricing-table .cluster h3{padding:0 }.page-template-customers .pricing-table
.cluster p{font-size:16px;margin:0 }.page-template-customers .mobile-only,.page-template-customers .mobile-only
.row{display:block }.page-template-customers .mobile-only .top-row .title h3{text-align:center }.page-template-
customers .mobile-only .top-row .title img{display:block;margin:0 auto }.page-template-customers .mobile-only
.cluster{text-align:left;-ms-flex-pack:start;justify-content:flex-start;padding:14px 34px !important }@media screen
and (min-width:800px){.page-template-customers .mobile-only{display:none }}.page-template-customers .mobile-
only .aws,.page-template-customers .mobile-only .cloud{background:#fafafa;margin:0 auto 30px;max-
width:600px;padding:33px 25px }@media screen and (max-width:850px){.page-template-customers .mobile-only
.aws .toggle,.page-template-customers .mobile-only .cloud .toggle{font-size:12px }}.page-template-customers
.mobile-only .aws h3,.page-template-customers .mobile-only .cloud h3{font-size:18px;padding:0 }.page-template-
customers .mobile-only .aws h4,.page-template-customers .mobile-only .cloud h4{padding:0;line-height:1 }.page-
template-customers .mobile-only .aws h4,.page-template-customers .mobile-only .aws p,.page-template-customers
.mobile-only .cloud h4,.page-template-customers .mobile-only .cloud p{font-size:12px }.page-template-customers
.mobile-only .aws>img,.page-template-customers .mobile-only .cloud>img{display:block;margin:0 auto
30px }.page-template-customers .mobile-only .aws>img+.row p,.page-template-customers .mobile-only
.cloud>img+.row p{margin-bottom:0 }.page-template-customers .mobile-only .col-sm-6{width:50% }.page-template-
customers .mobile-only .expand{border-top:2px solid #e6e6e6;display:none;margin-top:20px;padding-
top:20px }.page-template-customers .test-table{width:100% }@media screen and (max-width:1000px){.page-
template-customers .test-table{display:none }}.page-template-customers .test-table thead td:nth-child(2),.page-
template-customers .test-table thead td:nth-child(4){width:30% }.page-template-customers .test-table thead
td>div{border:2px solid rgba(142,144,147,.2);border-top-left-radius:25px;border-top-right-radius:25px;border-
bottom:0;padding:30px }.page-template-customers .test-table thead td:nth-child(3){width:25px }.page-template-
customers .test-table tbody td:nth-child(2)>div,.page-template-customers .test-table tbody td:nth-
child(4)>div{border:2px solid rgba(142,144,147,.2);border-bottom:0;border-top:0;padding:15px 30px }.page-
template-customers .test-table tbody td:first-child{padding:15px 30px }.page-template-customers .test-table tbody
td{vertical-align:top }.page-template-customers .test-table tbody td:nth-child(3){padding:0 }.page-template-
customers .test-table tbody td p{margin:0;font-size:15px;font-weight:300 }.page-template-customers .test-table
tbody tr:nth-child(odd){background:#fafafa }.page-template-customers .test-table tfoot td>div{border:2px solid
rgba(142,144,147,.2);border-bottom-left-radius:25px;border-bottom-right-radius:25px;border-
top:0;padding:30px }.page-template-customers .test-table--mobile{display:none;width:100% }@media screen and
(max-width:1000px){.page-template-customers .test-table--mobile{display:table }}.page-template-customers .test-
table--mobile thead h4{font-size:18px;font-weight:700;margin:0;padding:0 }.page-template-customers .test-table--
mobile thead h4+p{font-size:12px;font-weight:300;line-height:18px;margin-top:0;padding-top:0 }.page-template-
customers .test-table--mobile tbody tr:nth-child(odd){background:#fafafa }.page-template-customers .test-table--
mobile tbody td{padding:15px;vertical-align:top }.page-template-customers .test-table--mobile tbody
p{margin:0;font-size:16px;font-weight:300 }.page-template-customers .test-table--mobile tfoot td{padding:30px 0
60px }.wp .style-module--mainBanner--2fR-k{background-color:#b4e1e4 }.wp .page-template-about-rebrand
.main_banner{height:100vh;padding:0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;-ms-flex-align:center;align-items:center;background:url(https://cdn.confluent.io/wp-
content/uploads/about_bg_2019.jpg);background-size:cover;background-position:0 }.wp .page-template-about-
rebrand .main_banner .container h1{font-family:MarkOT;font-size:60px;font-weight:700;color:#fff }.wp .page-
template-about-rebrand .main_banner .container p{width:700px;max-width:90%;margin:0 auto;font-size:21px;font-

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family:MarkOT;line-height:1.69;color:#fff;font-weight:300}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue {background-color:#fff}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue .container h2 {font-family:MarkOT;font-size:14px;font-weight:500;text-
transform:uppercase}.wp .page-template-about-rebrand .section.bg_light_grayish_blue .container
h2:after {content:"";height:2px;width:40px;background:#257bd7;display:block;margin:-10px
auto;position:relative}.wp .page-template-about-rebrand .sub-text {width:708px;text-align:center;max-
width:90%;margin:60px auto}.wp .page-template-about-rebrand .sub-text-content {font-family:MarkOT;font-
size:48px;font-weight:500;line-height:1.15;color:#000}.wp .page-template-about-rebrand .background-section-
paragraphs {width:826px;font-family:MarkOT;font-size:16px;font-weight:300;line-height:1.88;letter-
spacing:normal;text-align:center;color:#101040;margin:auto;max-width:90%}.wp .page-template-about-rebrand
#management {background-color:#fafafa}.wp .page-template-about-rebrand .section.team_section h2 {font-
family:MarkOT;font-size:48px;font-weight:500;letter-spacing:.7px;text-align:center;color:#000;padding-
bottom:30px;padding-top:50px}.wp .page-template-about-rebrand .avatar_wrapper.team-toggle {border:4px solid
#fff;box-shadow:0 0 3px rgba(0,0,0,.2);display:inline-block;line-height:0;width:200px;height:200px}.wp .page-
template-about-rebrand .br_990 {display:none}.wp .page-template-about-rebrand .bg_linear_blue {background-
image:linear-gradient(90deg,#247cd7,#31bfc2)}.wp .page-template-about-rebrand
.circular_border_button_white {border-radius:8px;border:2px solid #fff;background-color:#fff;font-
family:MarkOT;font-size:14px;font-weight:500;color:#173361;letter-spacing:.5px;text-transform:uppercase}.wp
.page-template-about-rebrand .section.bg_orange.bg_linear_blue h2 {font-family:MarkOT;font-size:40px;font-
weight:700;line-height:1.13}.wp .page-template-about-rebrand .name.team-toggle {font-weight:700}.wp .page-
template-about-rebrand .team-member .social a {border-radius:5px;width:22px;height:22px;font-size:13px}.wp
.page-template-about-rebrand .social a .fa {font-size:15px}.wp .page-template-about-rebrand .position.team-
toggle {font-size:18px;font-weight:300;font-style:normal;font-stretch:normal;line-height:1.78}.wp .page-template-
about-rebrand .col-xs-12.col-sm-6.office {padding:0;min-height:500px;display:-ms-flexbox;display:flex;-ms-flex-
pack:center;justify-content:center;-ms-flex-align:center;align-items:center;background-
position:bottom;width:calc(50% - 2px)}.wp .page-template-about-rebrand .col-xs-12.col-sm-6.office:first-of-
type {margin-right:2px}.wp .page-template-about-rebrand .col-xs-12.col-sm-6.office:last-of-type {margin-
left:2px}.wp .page-template-about-rebrand .office_address_container {height:350px;width:376px;opacity:.8;border-
radius:8px;background-color:#000;max-width:90%;letter-spacing:.29px;font-weight:100}.wp .page-template-about-
rebrand .office_name {padding:75px 0 25px}.wp .page-template-about-rebrand .office_address,.wp .page-template-
about-rebrand .office_phone {font-size:20px}.wp .page-template-about-rebrand .section.team_section {background-
color:#fafafa;padding-bottom:130px}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section h2 {font-family:MarkOT;font-size:48px;font-weight:700;text-
transform:capitalize;letter-spacing:.7px;padding:0;margin:0}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section .container {max-width:90%}.wp .page-template-about-rebrand
.items.widthcol5.teams {margin-bottom:0}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section h2:after {display:none}.wp .page-template-about-rebrand .line-
container {position:absolute;bottom:0;width:100%}.wp .page-template-about-rebrand .line-container
.line {height:2px;display:block;border:1px solid #d3d3d3;margin:auto;width:1140px;max-width:90%}.wp .page-
template-about-rebrand .bg_vary_dark_blue.additional_resources_section.section {background-
image:none!important;background-color:#fff!important;padding-top:150px!important}.wp .page-template-about-
rebrand .bg_vary_dark_blue.additional_resources_section.section .container {width:1170px;max-
width:90%;padding:0}.wp .page-template-about-rebrand .bg_vary_dark_blue.additional_resources_section.section
h2 {font-size:48px;font-weight:700;letter-spacing:.7px;color:#000;margin-bottom:100px;padding-top:0}.wp .page-
template-about-rebrand .additional_resources_section .item {box-shadow:0 0 15px 0 rgba(0,0,0,.25);border-top:12px
solid #4698cb;transition:all .2s ease;padding:28px 25px 3px;border-bottom-left-radius:8px;border-bottom-right-
radius:8px}.wp .page-template-about-rebrand .additional_resources_section .item:hover {background-color:#fff;box-
shadow:2px 20px 20px 0 rgba(0,0,0,.25)}.wp .page-template-about-rebrand

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.bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control{width:calc(33.33% - 75px);margin:0 37.5px;padding:20px 0;text-align:left}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover img.cta\_icon{display:inline}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover img.cta\_icon\_hover{display:none}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3,.wp .page-template-about-rebrand .additional\_resources\_section .item:hover p{color:#4698cb}.wp .page-template-about-rebrand .additional\_resources\_section .item h3{font-family:MarkOT;font-size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;color:#4698cb}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3,.wp .page-template-about-rebrand .additional\_resources\_section .item:hover p{color:#000}.wp .page-template-about-rebrand .section.section .items.teams li{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}.wp .page-template-about-rebrand .additional\_resources\_section .item p{margin-bottom:50px}.wp .page-template-about-rebrand .cta\_icon{margin-left:-10px!important;margin-bottom:23px}.wp .page-template-about-rebrand .want\_to\_learn\_p\_mh{font-family:MarkOT;font-size:16px;font-weight:300;line-height:1.63;letter-spacing:.2px;color:#4a4a4a}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3{color:#4698cb}.wp .page-template-about-rebrand

.bg\_vary\_dark\_blue.additional\_resources\_section.section .col-xxs-12.col-xs-6.col-sm-6.col-md-4.items\_control{height:auto!important;padding:0}.wp .page-template-about-rebrand

.bg\_vary\_dark\_blue.additional\_resources\_section.section .col-xxs-12.col-xs-6.col-sm-6.col-md-4.items\_control a{background-color:#f16f45;color:#fff;opacity:1;margin-bottom:30px}.wp .page-template-about-rebrand .top-level-directors{display:-ms-flexbox;display:flex;width:100%}@media (min-width:990px){.wp .page-template-about-rebrand .top-level-directors{-ms-flex-pack:center;justify-content:center}.wp .page-template-about-rebrand

.bg\_vary\_dark\_blue.additional\_resources\_section.section .container .row,.wp .page-template-about-rebrand .items.widthcol5.teams{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:first-of-type{margin-left:0}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:last-of-type{margin-right:0}@media (max-width:768px){.wp .page-template-about-rebrand h2{line-height:1.3}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue .container h2:after{margin:0 auto}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .container{width:100%}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .row{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column;width:80%;margin:auto}.wp .page-template-about-rebrand .items\_control{width:100%;margin:0}.wp .page-template-about-rebrand

.bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control{width:100%;height:auto}.wp .page-template-about-rebrand .additional\_resources\_section .item a{margin-bottom:30px}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office{width:100%}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office:first-of-type{margin-right:0}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office:last-of-type{margin-left:0}.wp .page-template-about-rebrand .row.bod-list .col-xxs-12.col-xs-6.col-sm-6.col-md-4.team-member{width:50%}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:not(:last-of-type){margin-bottom:30px}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue.investors\_section li{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue.investors\_section li:nth-child(odd){padding:20px 7px 20px 15px}.wp .page-template-about-rebrand

.section.bg\_light\_grayish\_blue.investors\_section li:nth-child(2n){padding:20px 15px 20px 7px}.wp .page-template-about-rebrand .main\_banner .container p{max-width:80%;margin:auto}.style-module--modalVisible--2JxA1{overflow:hidden}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS{padding-top:80px;width:800px;max-width:90%;margin:0 auto 50px;text-align:left}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS h1{font-size:31px;font-weight:700;width:70%;text-align:center;margin:50px auto;line-height:125%;text-transform:uppercase}@media screen and (min-width:768px){.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS h1{font-size:38px}}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS

p{font-weight:300;line-height:175%;font-size:18px}.covid-relief-module--offeringSection--34r6\_{text-align:center}.covid-relief-module--offeringSection--34r6\_h2{width:900px;max-width:95%;color:#173361;margin:auto auto 40px}.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSummary--31Iue{font-size:16px;margin-bottom:50px;color:#173361}.covid-relief-module--offeringSection--34r6\_p{width:800px;max-width:95%;margin:25px auto}@media screen and (min-width:768px){.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}}.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO.covid-relief-module--offeringCopy--2yt09{text-align:left}@media screen and (min-width:768px){.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO.covid-relief-module--offeringCopy--2yt09{max-width:48%;-ms-flex:1 1;flex:1 1}}.covid-relief-module--offeringButton--2pwMm{margin-top:50px}.covid-relief-module--cardWrapper--DUVnd{border-radius:8px;border:2px solid rgba(130,148,148,.25);padding:25px;width:800px;max-width:95%;margin:0 auto 10px}.covid-relief-module--cardWrapper--DUVnd h4{color:#173361;font-weight:700}@media screen and (max-width:991px){.style-module--hero--1FU4d.container{-ms-flex-direction:column-reverse;flex-direction:column-reverse;height:auto;min-height:400px}}@media screen and (max-width:991px){.style-module--hero--1FU4d.container.style-module--content--3wHkp{text-align:center}}@media screen and (min-width:992px){.style-module--hero--1FU4d.container.style-module--content--3wHkp{width:100%}}.style-module--hero--1FU4d.container.style-module--imageContainer--2XT8f img{border:15px solid #fff;border-radius:5px;max-width:380px}.style-module--card--3Yp\_S{margin:40px 0;background:#fff}.style-module--card--3Yp\_S h3{font-size:18px;font-weight:700;color:rgba(0,0,0,.85);margin:0 0 20px}.style-module--card--3Yp\_S.container{display:-ms-flexbox;display:flex;box-shadow:0 3px 31px 0 rgba(57,84,109,.14);padding:25px;width:100%}@media screen and (max-width:991px){.style-module--card--3Yp\_S.container{-ms-flex-direction:column;flex-direction:column}}.style-module--card--3Yp\_S.container.style-module--right--3X6O9{-ms-flex-direction:row-reverse;flex-direction:row-reverse}@media screen and (max-width:991px){.style-module--card--3Yp\_S.container.style-module--right--3X6O9{-ms-flex-direction:column-reverse;flex-direction:column-reverse}}.style-module--card--3Yp\_S.style-module--description--1v6zY{font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85)}.style-module--card--3Yp\_S.style-module--textContainer--38irh{margin:20px;-ms-flex:2 1;flex:2 1;width:100%}.style-module--card--3Yp\_S.style-module--textContainer--38irh pre{overflow:scroll}.style-module--card--3Yp\_S.style-module--imageContainer--2i\_kX{-ms-flex:1 1;flex:1 1}.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX{margin-left:80px}.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{margin-right:80px}.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX,.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{max-width:465px;min-width:200px;text-align:center}@media screen and (max-width:991px){.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX,.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{margin:0 auto}}.style-module--cardContainer--TkI1J{display:block}.style-module--cardContainer--TkI1J h2{margin-bottom:40px}.style-module--cardContainer--TkI1J.style-module--description--1-eWt{font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85);text-align:center;margin-bottom:100px}.style-module--group--2btFr.style-module--cards--3S\_hd{box-shadow:0 3px 31px 0 rgba(57,84,109,.14);padding:25px;background:#fff}.style-module--group--2btFr.style-module--cards--3S\_hd>div{margin:0}.style-module--group--2btFr.style-module--cards--3S\_hd>div>div{box-shadow:none;padding:25px 0;border-bottom:1px solid rgba(0,0,0,.1)}.style-module--group--2btFr.style-module--cards--3S\_hd>div:first-of-type>div{padding-top:0}.style-module--group--2btFr.style-module--cards--3S\_hd>div:last-of-type>div{padding-bottom:0;border-bottom:0}.style-module--faq--2lnMY h2{color:#173361;font-size:28px;font-weight:500;margin-bottom:90px;text-align:center}@media screen and (max-width:767px){.style-module--faq--2lnMY h2{font-size:21px}}.style-module--faq--2lnMY.style-module--list--2VXxQ{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-

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wrap:wrap;flex-wrap:wrap}.style-module--faq--2lnMY .style-module--list--2VXxQ>div{width:48%}@media
screen and (max-width:767px){.style-module--faq--2lnMY .style-module--list--2VXxQ>div{width:100%}}.style-
module--faq--2lnMY .style-module--list--2VXxQ .style-module--item--3p8Bv{margin-bottom:30px}.style-module-
-faq--2lnMY .style-module--list--2VXxQ .style-module--item--3p8Bv h3{margin:0 0 20px;font-size:18px;font-
weight:700;color:rgba(0,0,0,.85)}.style-module--faq--2lnMY .style-module--list--2VXxQ .style-module--item--
3p8Bv p{text-align:justify;font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85);margin:0}.style-
module--textCta--3ZsDH .style-module--title--2a9FF{margin-bottom:90px}.style-module--textCta--3ZsDH .style-
module--content--1zhSd{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-
flex-wrap:wrap;flex-wrap:wrap}.style-module--textCta--3ZsDH .style-module--content--
1zhSd>div{width:48%}@media screen and (max-width:767px){.style-module--textCta--3ZsDH .style-module--
content--1zhSd>div{width:100%;margin:30px 0}.style-module--textCta--3ZsDH .style-module--content--
1zhSd>div:first-child{margin-top:0}}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div
h3{color:rgba(0,0,0,.85);font-size:28px;font-weight:300;margin:0 0 30px;line-height:1.2}.style-module--textCta--
3ZsDH .style-module--content--1zhSd>div .list-links{margin:0;padding:0;list-style:none;list-style-
position:inside;line-height:1.86}@media screen and (max-width:767px){.style-module--textCta--3ZsDH .style-
module--content--1zhSd>div .list-links{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-
flex-pack:justify;justify-content:space-between;width:100%}}@media screen and (max-width:767px){.style-
module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li{width:48%}}@media screen and (max-
width:575px){.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li{width:100%}}.style-
module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links
li:before{content:"\2022";color:#257bd7;font-weight:700;display:inline-block;width:1em;margin-right:5px;vertical-
align:middle}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li a{color:#257bd7;font-
size:14px}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .faq h3{color:rgba(0,0,0,.85);font-
size:18px;font-weight:700;margin:30px 0 20px}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div
.faq p{color:rgba(0,0,0,.85);font-size:14px;font-weight:300;line-height:1.79}.style-module--html--hXhKt .cta-
container{text-align:center}.style-module--html--hXhKt .cta-container a{transition:all .5s ease-in-out;transition:all
.5s cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;letter-spacing:.9px;line-
height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-transform:uppercase;background-
color:#38cccd;border:1px solid #38cccd;color:#fff;font-weight:700;max-width:300px;width:90%}.style-module--
html--hXhKt .cta-container a:hover{cursor:pointer;text-decoration:none}.style-module--layout--
1T_e6{background:#f3f4f7}.style-module--layout--1T_e6 .style-module--content--
3E83u>div{background:none}.style-module--layout--1T_e6 .style-module--content--3E83u>div>div{padding:90px
0}.style-module--layout--1T_e6 .style-module--content--3E83u>div:nth-child(2)>div{padding-top:0}.style-module-
-layout--1T_e6 .style-module--content--3E83u>div:nth-child(odd){background:#fff}.style-module--layout--1T_e6
.style-module--content--3E83u ol+p,.style-module--layout--1T_e6 .style-module--content--3E83u p+p,.style-
module--layout--1T_e6 .style-module--content--3E83u ul+p{margin-top:15px}.style-module--label--
1wBOP{position:relative}.style-module--checkbox--
4RNxb{position:absolute;top:0;left:0;height:25px;width:25px;border:1.1px solid #e3e4e5;transition:all .2s ease-in-
out;background:#fff;border-radius:4px}.style-module--checkbox--
4RNxb:after{content:"";position:absolute;display:none;background-
color:#173361;width:100%;height:100%;border-radius:4px}.style-module--input--mBEsz{width:auto}.style-
module--input--mBEsz:checked+.style-module--checkbox--4RNxb:after{display:block}.style-module--popup--
1HA66{opacity:0;position:fixed;top:100%;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);transition:all .25s ease-in-out;background:#fff;width:100%;z-index:9999;border-
radius:8px;padding:25px;max-width:475px;max-height:80%;overflow-y:scroll}.style-module--popup--1HA66.style-
module--active--3SoXb{opacity:1;top:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-
50%)}.style-module--popup--1HA66 label{display:none}.style-module--popup--1HA66 form{font-
family:inherit!important;font-size:16px!important;width:100%!important;display:-ms-
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flexbox !important; display: flex !important; -ms-flex-direction: column; flex-direction: column } .style-module--popup--
1HA66 form input[type=email], .style-module--popup--1HA66 form input[type=tel], .style-module--popup--1HA66
form input[type=text] { background-color: #fff; border: 2px solid rgba(130, 148, 148, .25); border-
radius: 4px; width: 100% !important; margin-bottom: 5px; color: #000; font-size: 14px; font-weight: 300; line-
height: 1.2; padding: 10px; box-shadow: none } .style-module--popup--1HA66 form input[type=email]::-webkit-input-
placeholder, .style-module--popup--1HA66 form input[type=tel]::-webkit-input-placeholder, .style-module--popup--
1HA66 form input[type=text]::-webkit-input-placeholder { color: #829494 } .style-module--popup--1HA66 form
input[type=email]::-moz-placeholder, .style-module--popup--1HA66 form input[type=tel]::-moz-placeholder, .style-
module--popup--1HA66 form input[type=text]::-moz-placeholder { color: #829494 } .style-module--popup--1HA66
form input[type=email]::-ms-input-placeholder, .style-module--popup--1HA66 form input[type=tel]::-ms-input-
placeholder, .style-module--popup--1HA66 form input[type=text]::-ms-input-placeholder { color: #829494 } .style-
module--popup--1HA66 form input[type=email]::placeholder, .style-module--popup--1HA66 form
input[type=tel]::placeholder, .style-module--popup--1HA66 form
input[type=text]::placeholder { color: #829494 } .style-module--popup--1HA66 form
input[type=checkbox] { border: 1px solid #173361; border-radius: 2px; -webkit-appearance: none; -moz-
appearance: none; appearance: none; height: 14px; width: 14px; outline: 0 } .style-module--popup--1HA66 form
input[type=checkbox]:checked { background: #173361 } .style-module--popup--1HA66 form
input[type=checkbox]+label { color: #000; font-size: 12px; font-weight: 300; margin-bottom: 15px; margin-
left: 25px } .style-module--popup--1HA66 form input[type=checkbox]+label:last-child { margin-bottom: 0 } .style-
module--popup--1HA66 form .mktoLabel { color: #000; font-size: 12px; font-
weight: 300 !important; margin: 0; padding: 0 } .style-module--popup--1HA66 form .mktoLabel a { text-
decoration: underline } .style-module--popup--1HA66 form
select.mktoField { outline: 0; width: 100% !important; padding: 7px 10px !important; background: #fff; border: 2px solid
rgba(130, 148, 148, .25) !important; color: #829494; font-size: 14px !important; font-weight: 300; height: 40px; -webkit-
appearance: none; -moz-appearance: none; appearance: none; background-
image: url(https://cdn.confluent.io/images/arrow-down-blue.png); background-position: calc(100% - 10px)
50%; background-repeat: no-repeat; box-shadow: none } .style-module--popup--1HA66 form .mktoFormCol { min-
height: unset !important; width: 100% } .style-module--popup--1HA66 form .mktoAsterix, .style-module--popup--
1HA66 form .mktoClear, .style-module--popup--1HA66 form .mktoError, .style-module--popup--1HA66 form
.mktoGutter, .style-module--popup--1HA66 form .mktoOffset { display: none !important } .style-module--popup--
1HA66 form .mktoFieldWrap { width: 100% } .style-module--popup--1HA66 form
.mktoFieldWrap>div { padding: 0; width: 100% !important } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoCheckboxList { padding: 20px 0 } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoHtmlText { color: #829494; font-size: 10px; font-weight: 300; line-height: 2 } .style-module--popup--1HA66 form
.mktoFieldWrap .mktoHtmlText br { display: none } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoInvalid { border: 2px solid #d8365d !important } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoInvalid.mktoCheckboxList { border: 1px solid #d8365d } .style-module--popup--1HA66 form
.mktoButtonRow { margin: 20px 0; width: 100%; text-align: center } .style-module--popup--1HA66 form
.mktoButtonRow .mktoButtonWrap { margin: 0 !important } .style-module--popup--1HA66 form .mktoButtonRow
.mktoButtonWrap .mktoButton, .style-module--popup--1HA66 form .mktoButtonRow
.mktoButtonWrap.mktoSimple .mktoButton { transition: all .5s ease-in-out; transition: all .5s cubic-
bezier(.785, .135, .15, .86); border-radius: 6px; display: inline-block; font-size: 12px; font-weight: 700; letter-
spacing: .9px; line-height: 1.5; padding: 12px 30px; text-align: center; text-decoration: none; text-
transform: uppercase; background-color: #173361; border: 1px solid #173361; color: #fff; background-image: none; box-
shadow: none } .style-module--popup--1HA66 form .mktoButtonRow .mktoButtonWrap .mktoButton: hover, .style-
module--popup--1HA66 form .mktoButtonRow .mktoButtonWrap.mktoSimple
.mktoButton: hover { cursor: pointer; text-decoration: none; background: #0074a2; border-color: #0074a2 } .style-module--
popup--1HA66 .style-module--title--3jrsZ, .style-module--popup--1HA66 h4 { color: #173361; font-size: 18px; font-

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weight:700;text-align:center;margin:0 0 25px}.style-module--popup--1HA66 .style-module--title--3jrsZ br,.style-module--popup--1HA66 h4 br{display:none}.style-module--popup--1HA66 .style-module--thankyou--3gN4F{color:#173361;font-size:28px;font-weight:700;text-align:center}#mktoForm\_4261 .mktoFormRow:first-of-type{-ms-flex-order:1;order:1}.style-module--formWrapper--3Qo2L{width:800px;margin:auto;max-width:95%}.style-module--formWrapper--3Qo2L .style-module--wrapper--1-KWg{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--formWrapper--3Qo2L .style-module--wrapper--1-KWg .style-module--checkBoxSpan--Wfipq{width:22px;height:22px}.style-module--formWrapper--3Qo2L .style-module--inputFieldWrapper--3MFi-.style-module--formWrapper--3Qo2L button div{text-align:center}.style-module--formWrapper--3Qo2L .style-module--inputFieldWrapper--3MFi-{padding:10px;background-color:rgba(130,148,148,.25);border-radius:4px}.style-module--formWrapper--3Qo2L .style-module--label--3wd4p{padding-left:10px}.style-module--formWrapper--3Qo2L .style-module--thankYou--3K4Q8{text-align:center}.style-module--confirmation--3GwEz{margin:100px 0 150px}.style-module--confirmation--3GwEz h4{margin-bottom:10px}.style-module--confirmation--3GwEz img{width:40px;margin-bottom:10px}.style-module--confirmation--3GwEz p{color:#0074a2;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--agreeTellMore--1XsxA{position:relative}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL{position:absolute;top:0;background:#fbebef;width:100%;z-index:1;border:1px solid #d8365d;padding:20px;text-align:center;border-radius:4px;font-size:13px;color:#d8365d;opacity:0;visibility:hidden;transition:all .3s ease-in-out}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL:first-of-type{font-weight:700;font-size:15px}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL.style-module--show--1arAG{opacity:1;visibility:visible}.style-module--us--6zV9S .style-module--tos--31nfQ{display:none}.style-module--tos--1ShSb{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.style-module--tosUS--30ljb,.style-module--us--2VtUI .style-module--tos--1ShSb{display:none}.style-module--us--2VtUI .style-module--tosUS--30ljb{display:block}.style-module--confirmation--KDDmz{margin:100px 0 150px}.style-module--confirmation--KDDmz h4{margin-bottom:10px}.style-module--confirmation--KDDmz img{width:40px;margin-bottom:10px}.style-module--confirmation--KDDmz>p{color:#0074a2;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin-top:25px}.style-module--confirmation--KDDmz>p a{text-decoration:underline}.style-module--cardContainer--3lwMG{margin-top:50px}.style-module--cardContainer--3lwMG .style-module--card--LeUB9{background:#e6f5fb;padding:25px 10px}.style-module--cardContainer--3lwMG .style-module--card--LeUB9 h3{font-size:14px;font-weight:700}.style-module--us--3qmiT .style-module--tos--GbbpQ{display:none}.style-module--tos--2V0no{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.style-module--tosUS--PyizL,.style-module--us--2bsmN .style-module--tos--2V0no{display:none}.style-module--us--2bsmN .style-module--tosUS--PyizL{display:block}.style-module--tos--3mMRP{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.compare-module--heroSection--jsMPY{padding-bottom:220px}.compare-module--heroSection--jsMPY .compare-module--content--3J24J{width:auto!important}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p{color:#173361;font-size:24px;margin-top:15px!important}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p a{color:#38cccd}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p+p{font-size:14px;margin-top:30px!important}.compare-module--contentSection--Idew\_{padding-top:0;padding-bottom:0}.compare-module--contentSection--Idew\_>div{position:relative;top:-290px}@media screen and (max-width:767px){.compare-module--contentSection--Idew\_>div{top:-240px}}.compare-module--customList--330aP{margin:0;padding:0;list-style:none}.compare-module--customList--330aP li{display:inline-block}.compare-module--customList--330aP li+li{margin-left:15px}.compare-module--card--1U3nw{display:-ms-flexbox;display:flex;box-shadow:0 30px 60px -30px rgba(0,0,0,.06),0 50px 100px -20px rgba(69,107,122,.24);border-radius:4px;max-width:900px;margin:0 auto}@media screen and (max-width:767px){.compare-module--card--1U3nw{-ms-flex-direction:column;flex-direction:column}}.compare-module--card--1U3nw+.compare-module--card--1U3nw{margin-top:60px}.compare-module--card--

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1U3nw.compare-module--hide--rBHxL{display:none}.compare-module--leftColumn--
1lpXq{background:#fff;width:60%;padding:50px 75px}@media screen and (max-width:767px){.compare-module--
leftColumn--1lpXq{padding:35px;width:100%}}.compare-module--leftColumn--1lpXq h2{color:#173361;font-
size:40px;font-weight:500;margin:0 0 10px}@media screen and (max-width:767px){.compare-module--
leftColumn--1lpXq h2{font-size:24px}}.compare-module--leftColumn--1lpXq a{color:#38cccd}.compare-module--
rightColumn--1YbBG{background:#f5f5f5;-ms-flex:1 1;flex:1 1;padding:50px}@media screen and (max-
width:767px){.compare-module--rightColumn--1YbBG{padding:35px}}.compare-module--rightColumn--1YbBG
h3{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-weight:700}.compare-
module--rightColumn--1YbBG .compare-module--cloudProvider--O3phl{border-bottom:2px solid
rgba(130,148,148,.25);margin-bottom:85px;padding-bottom:35px}.compare-module--rightColumn--1YbBG
.compare-module--cloudProvider--O3phl h3{margin:0}.compare-module--rightColumn--1YbBG .compare-module-
-cloudProvider--O3phl .compare-module--customList--330aP{display:-ms-flexbox;display:flex;margin:25px 0
10px}.compare-module--rightColumn--1YbBG .compare-module--feature--1SBsN{padding:0}.compare-module--
rightColumn--1YbBG .compare-module--feature--1SBsN h3{font-size:15px;line-height:21px}.compare-module--
rightColumn--1YbBG .compare-module--feature--1SBsN+.compare-module--feature--1SBsN{margin-
top:40px}.compare-module--rightColumn--1YbBG .compare-module--featureBlurb--36n_N{margin-
top:5px}.compare-module--rightColumn--1YbBG .compare-module--featureBlurb--36n_N p{color:#0074a2;font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-size:14px;line-height:21px;margin:0}.compare-
module--form--3C4lg{margin-top:25px}.compare-module--form--3C4lg h4{color:#173361;font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0;font-weight:700;margin:0 0 25px}.compare-module--form--3C4lg
.compare-module--title--
16y3G:before{content:"";background:#38cccd;width:30px;display:block;height:4px;border-radius:20px;margin-
bottom:10px}.compare-module--form--3C4lg button{width:100%}.compare-module--form--3C4lg .compare-
module--formConfluentCloud--3p_Qj>*,.compare-module--form--3C4lg .compare-module--
formConfluentPlatform--1GPOM>*,.compare-module--form--3C4lg .compare-module--
formConfluentPlatformCommunity--3voiH>*{margin-bottom:10px}.compare-module--form--3C4lg .compare-
module--formConfluentCloud--3p_Qj>:last-child,.compare-module--form--3C4lg .compare-module--
formConfluentPlatform--1GPOM>:last-child,.compare-module--form--3C4lg .compare-module--
formConfluentPlatformCommunity--3voiH>:last-child{margin-bottom:0}.compare-module--footer--3Qjxv{margin-
top:10px}.compare-module--footer--3Qjxv .compare-module--existingAccount--2h1CU{text-align:center;font-
size:13px;font-weight:500;color:#504f6c}.compare-module--footer--3Qjxv .compare-module--
additionalInformation--1uuzb{margin:35px 0 0;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-
wrap:wrap}.compare-module--footer--3Qjxv .compare-module--additionalInformation--1uuzb
p{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-weight:700;margin-
right:15px;width:200px}.compare-module--footer--3Qjxv .compare-module--additionalInformation--1uuzb
ul{width:150px}.compare-module--blurb--1ZA6n{color:#504f6c;font-size:16px;font-weight:300;line-
height:25px;letter-spacing:0}.compare-module--cpCommunity--2GCVu .compare-module--leftColumn--
1lpXq{width:100%}.style-module--switch--13P_i{position:relative;display:inline-
block;width:60px;height:34px;margin-right:15px!important;margin-top:30px!important;margin-
bottom:30px!important;min-width:60px}.style-module--switchInput--2NPF7{opacity:0;width:0;height:0}.style-
module--slider--3eAa2{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.style-module--slider--
3eAa2:before{position:absolute;content:"";height:26px;width:26px;left:4px;bottom:4px;background-color:#fff;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25);transition:.4s}input:checked+.style-module--slider--
3eAa2:before{background-color:#4698cb;-ms-transform:translateX(26px);transform:translateX(26px)}.style-
module--round--Gt-XR{border-radius:34px}.style-module--slider--3eAa2.style-module--round--Gt-
XR:before{border-radius:50%}.style-module--toggleWrapper--u8bXz{display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center}.style-module--error--AAShr{border:1px solid #8c0005}.wp .email-preferences-

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page .container{padding-left:21px;padding-right:25px}.wp .email-preferences-page .section__preference-center-
header .title{font-family:MarkOT;font-size:36px;font-weight:700;font-style:normal;font-stretch:normal;line-
height:1.45;letter-spacing:normal;text-align:left;color:#003b49;padding-top:8px;padding-bottom:36px}.wp .email-
preferences-page .section__preference-center-header .sub_title{font-family:MarkOT;font-size:16px!important;font-
weight:400;font-style:normal;font-stretch:normal;line-height:2!important;letter-spacing:2px;text-
align:left;color:#173361;padding-top:89px}.wp .email-preferences-page .section_preference_center form.mktoForm
select.mktoField{background-color:#fff!important}.wp .email-preferences-page .section_preference_center
.mktoForm .mktoFormRow{display:inline-block;width:40.6%;clear:inherit;background:#fff;margin-
bottom:50px!important}.wp .email-preferences-page .mktoForm .mktoLabel{padding-top:0!important}.wp .email-
preferences-page form.mktoForm .mktoFormRow{background-color:#fff}.wp .email-preferences-page
form.mktoForm .mktoRequiredField label.mktoLabel,.wp .email-preferences-page form.mktoForm
label.mktoLabel{font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-stretch:normal;line-
height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase}.wp .email-preferences-page
form.mktoForm input.mktoField,.wp .email-preferences-page form.mktoForm select.mktoField,.wp .email-
preferences-page form.mktoForm textarea.mktoField{height:48px;font-family:MarkOT;font-size:16px;font-
weight:300;font-style:normal;font-stretch:normal;line-height:2!important;letter-spacing:.2px;text-
align:left;color:#4a4a4a;padding:8px 12px!important;border:1px solid #a7a7a8!important;background-
color:#fff;border-radius:2px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel[for=Email]:after{left:125px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel[for=Country]:after{left:185px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel:after{content:"*";font-size:12px;color:#173361;position:absolute;left:95px}.wp .email-preferences-
page hr{height:5px;background-color:#000;opacity:.06;margin-top:75px;margin-right:28px}.wp .email-preferences-
page .subscription_sub_title,.wp .email-preferences-page .subscription_title{color:#4a4a4a;font-
family:MarkOT;font-style:normal;font-stretch:normal;text-align:left}.wp .email-preferences-page
.subscription_title{font-size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;padding-top:0}.wp .email-
preferences-page .subscription_sub_title{height:92px;font-size:16px;font-weight:300;line-height:2;letter-
spacing:.2px}.wp .email-preferences-page .marketo_video_title{font-family:MarkOT;font-size:36px;font-
weight:700;font-style:normal;font-stretch:normal;line-height:1.45;letter-spacing:normal;text-
align:left;color:#003b49;padding-bottom:90px;text-align:center;padding-top:15px}.wp .email-preferences-page
.mktoForm div .marketo_video_container{padding-top:85px}.wp .email-preferences-page
.video_container{position:relative;background-repeat:no-repeat;background-size:contain;background-
position:50%;margin:auto;border-radius:15px}.wp .email-preferences-page .gdpr-video{display:block;margin-
bottom:90px!important;margin-left:96px!important;margin-
right:auto!important;border:0;height:auto;outline:0;width:83.5%}.wp .email-preferences-page .gdpr-video
a.play_btn{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/video-button-
585.png)!important;background-
size:contain!important;position:absolute;content:"play";display:block;width:68px;height:82px;text-align:left;text-
indent:-9999px;background-repeat:no-repeat;top:70%;left:46%;margin-top:-41px;margin-left:-34px}.wp .email-
preferences-page #subscriptionBlogs,.wp .email-preferences-page #subscriptionEducational,.wp .email-preferences-
page #subscriptionEvents,.wp .email-preferences-page #subscriptionNewsletter,.wp .email-preferences-page
#subscriptionProductUpdates,.wp .email-preferences-page #Unsubscribed,.wp .email-preferences-page
form.mktoForm input#subscriptionWebinars{height:0}.wp .email-preferences-page .section_preference_center
form.mktoForm .mktoButtonWrap.mktoRound .mktoButton{width:168px;height:48px;border-
radius:100px;background-color:#4698cb;transition:all .3s ease;float:left;margin-bottom:120px}.wp .email-
preferences-page .UnsubscribedReason--hide{display:none!important}.wp .email-preferences-page form.mktoForm
.mktoFormRow .mktoFormCol:first-child:nth-last-child(3){width:15%;float:left}.wp .email-preferences-page
form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol{width:58%}.wp .email-
preferences-page form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol

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strong{display:block;margin-top:6px;position:relative}.wp .email-preferences-page [for=Unsubscribed]:after,.wp
.email-preferences-page [for=UnsubscribedReason]:after{content:"";display:none!important}.wp .email-
preferences-page .switch{position:relative;display:inline-block;width:50px;height:28px;margin-
left:0!important}.wp .email-preferences-page .mktoForm input[type=checkbox]+label:before,.wp .email-
preferences-page .switch input{display:none}.wp .email-preferences-page
.slider{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.wp .email-preferences-page
.slider:before{position:absolute;content:"";height:28px;width:28px;background-color:#fff;transition:.4s;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25)}.wp .email-preferences-page input:focus+.slider{box-shadow:0 0 1px
#2196f3}.wp .email-preferences-page input:checked+.slider:before{background-color:#4698cb;-ms-
transform:translateX(26px);transform:translateX(26px)}.wp .email-preferences-page .slider.round{border-
radius:34px}.wp .email-preferences-page .slider.round:before{border-radius:50%}.wp .email-preferences-page
.update_message{float:left;margin-top:100px!important;margin-bottom:120px!important;margin-
left:25px!important;font-family:MarkOT;font-size:12px;font-weight:300;font-style:normal;font-stretch:normal;line-
height:1.67;letter-spacing:.2px;text-align:left;color:#8e9093}@media only screen and (max-width:760px) and (min-
width:479px){.wp .email-preferences-page form.mktoForm .mktoHtmlText{margin-left:25px}}@media only screen
and (max-width:400px){.wp .email-preferences-page form.mktoForm .mktoFieldWrap{width:350px!important}.wp
.email-preferences-page hr{height:1px!important;padding:1px!important}.wp .email-preferences-page .gdpr-video
a.play_btn{top:88%;width:30px}.wp .email-preferences-page .mktoForm div .marketo_video_container{padding-
top:20px}}@media only screen and (max-width:697px){.wp .email-preferences-page .section_preference_center
.mktoForm .mktoFormRow{width:100%}}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFieldDescriptor{float:none;width:100%}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow{display:block;float:none;width:100%}.wp .email-
preferences-page .section_preference_center #mktoForm_2386
input{height:auto!important;opacity:1!important}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFieldWrap{width:100%!important}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 div.mktoLogicalField{width:auto!important}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFieldWrap label,.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(5)
.mktoHtmlText{width:100%!important}.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7){margin-top:86px;padding-top:86px;border-top:5px solid #dce0e4}@media only screen
and (min-width:768px){.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7){display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-
between}.wp .email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7)
.mktoFieldDescriptor{width:50%}.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7) .mktoFormCol:nth-child(2){display:none}}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFieldDescriptor
.mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-direction:row-reverse;flex-direction:row-reverse}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7)
.mktoFieldDescriptor .mktoFieldWrap label{display:block;margin-bottom:40px;position:relative;top:-2px}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13){display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-start}@media only screen and (min-
width:768px){.wp .email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-
child(n+8):nth-child(-n+13){float:left;width:50%}}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b{padding:0!important}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13) .mktoFormCol b span{color:#4a4a4a;font-size:24px!important;font-weight:700;line-height:1.58;letter-
spacing:.7px;padding-top:0}.wp .email-preferences-page .section_preference_center #mktoForm_2386

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.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b+span{ color:#4a4a4a;display:block;font-size:16px!important;font-weight:300;line-height:30px;margin-bottom:40px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFieldDescriptor{ position:relative;padding-right:24px;width:auto }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(14){ clear:both }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15){ display:-ms-flexbox;display:flex;margin-top:40px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) h1{ color:grey!important;font-size:16px!important;font-weight:400!important;letter-spacing:2px!important;text-transform:uppercase }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldDescriptor{ position:relative;width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap>label,.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label .slider.round{ display:none!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label input{ display:block!important;margin:0!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFormCol{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap .mktoHtmlText{ width:100%!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap h1{ padding:0!important;width:100%!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(16) label:after{ left:175px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoButtonWrap.mktoRound .mktoButton{ margin:60px 0 100px;width:auto!important }.wp .email-preferences-page .input-field-wrapper{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between }.wp .email-preferences-page .line-dot-right{ margin-top:75px;max-width:100%;margin-bottom:20px }.wp .email-preferences-page .line-dot-right:before{ content:"";display:block;width:calc(100% - 10px);height:1px;border:2.5px solid #dce0e4;position:absolute;left:0;border-radius:5px }.wp .email-preferences-page .preferences-toggle-wrapper{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between;margin-top:100px }.wp .email-preferences-page .preferences-toggle{ width:45%;-ms-flex-align:start;align-items:flex-start;margin-bottom:40px }.wp .email-preferences-page .subscription\_sub\_title{ height:auto }.wp .email-preferences-page .mktoForm button.mktoButton{ width:168px;height:48px;border-radius:100px;background-color:#4698cb;transition:all .3s ease;float:left;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;color:#fff;border:none;margin-bottom:40px }.wp .email-preferences-page .small{ font-size:18px }.wp .email-preferences-page .reason-wrapper{ width:456px;max-width:90%;margin-bottom:50px }.wp .email-preferences-page .mktoForm .mktoAsterix{ display:block;color:#bf0000;font-size:13px }.wp .email-preferences-page .mktoForm label{ font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-stretch:normal;line-height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase }.wp .email-preferences-page .preferences-thank-you{ font-size:18px;letter-spacing:.2px;color:#8e9093 } @media (max-width:768px){ .wp .email-preferences-page .preferences-toggle{ width:100% } }.wp .email-preferences-page .unsubscribe-reason-wrapper{ margin-bottom:20px }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField{ float:none;font-size:inherit;line-height:inherit }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div{ padding:6px 15px;height:48px;max-width:none;border-width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div>div:last-child{ max-width:none;top:47px;border-

width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a;width:calc(100% + 2px);left:-1px}.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div .icon{margin-right:15px}.wp .page-template-unsubscribe{margin-bottom:50px}.wp .page-template-unsubscribe .section\_\_preference-center-header .title{color:#343941}.wp .page-template-unsubscribe .mktoButton{width:168px;height:48px;border-radius:100px;background-color:#4698cb;transition:all .3s ease;margin-bottom:120px;color:#fff;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;border:none}.wp .page-template-unsubscribe .container{padding-left:21px;padding-right:25px}.wp .page-template-unsubscribe .section\_\_preference-center-header .title{font-family:MarkOT;font-size:36px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.45;letter-spacing:normal;text-align:left;color:#003b49;padding-top:8px;padding-bottom:36px}.wp .page-template-unsubscribe .section\_\_preference-center-header .sub\_title{font-family:MarkOT;font-size:16px !important;font-weight:400;font-style:normal;font-stretch:normal;line-height:2 !important;letter-spacing:2px;text-align:left;color:#173361;padding-top:89px}.wp .page-template-unsubscribe .section\_\_preference\_center form.mktoForm select.mktoField{background-color:#fff !important}.wp .page-template-unsubscribe .section\_\_preference\_center .mktoForm .mktoFormRow{display:inline-block;width:40.6%;clear:inherit;background:#fff}.wp .page-template-unsubscribe .mktoForm .mktoLabel{padding-top:0 !important}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow{background-color:#fff}.wp .page-template-unsubscribe form.mktoForm .mktoRequiredField label.mktoLabel,.wp .page-template-unsubscribe form.mktoForm label.mktoLabel{font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-stretch:normal;line-height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase}.wp .page-template-unsubscribe form.mktoForm input.mktoField,.wp .page-template-unsubscribe form.mktoForm select.mktoField,.wp .page-template-unsubscribe form.mktoForm textarea.mktoField{height:48px;font-family:MarkOT;font-size:16px;font-weight:300;font-style:normal;font-stretch:normal;line-height:2 !important;letter-spacing:.2px;text-align:left;color:#4a4a4a;padding:8px 12px !important;border:1px solid #a7a7a8 !important;background-color:#fff;border-radius:2px}.wp .page-template-unsubscribe form.mktoForm .mktoRequiredField label.mktoLabel[for=Email]:after{left:125px}.wp .page-template-unsubscribe form.mktoForm .mktoRequiredField label.mktoLabel[for=Country]:after{left:185px}.wp .page-template-unsubscribe form.mktoForm .mktoRequiredField label.mktoLabel:after{content:"\*";font-size:12px;color:#173361;position:absolute;left:95px}.wp .page-template-unsubscribe hr{height:5px;background-color:#000;opacity:.06;margin-top:75px;margin-right:28px}.wp .page-template-unsubscribe .subscription\_sub\_title,.wp .page-template-unsubscribe .subscription\_title{color:#4a4a4a;font-family:MarkOT;font-style:normal;font-stretch:normal;text-align:left}.wp .page-template-unsubscribe .subscription\_title{font-size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;padding-top:0;margin-top:40px}.wp .page-template-unsubscribe .subscription\_title .asterix{color:#bf0000;font-size:13px;vertical-align:top}.wp .page-template-unsubscribe .subscription\_sub\_title{height:92px;font-size:16px;font-weight:300;line-height:2;letter-spacing:.2px}.wp .page-template-unsubscribe .marketo\_video\_title{font-family:MarkOT;font-size:36px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.45;letter-spacing:normal;text-align:left;color:#003b49;padding-bottom:90px;text-align:center;padding-top:15px}.wp .page-template-unsubscribe .mktoForm div .marketo\_video\_container{padding-top:85px}.wp .page-template-unsubscribe .video\_container{position:relative;background-repeat:no-repeat;background-size:contain;background-position:50%;margin:auto;border-radius:15px}.wp .page-template-unsubscribe .gdpr-video{display:block;margin-bottom:90px !important;margin-left:96px !important;margin-right:auto !important;border:0;height:auto;outline:0;width:83.5%}.wp .page-template-unsubscribe .gdpr-video a.play\_btn{background-image:url(//www.confluent.io/wp-content/themes/confluent/assets/images/video-button-585.png) !important;background-size:contain !important;position:absolute;content:"play";display:block;width:68px;height:82px;text-align:left;text-indent:-9999px;background-repeat:no-repeat;top:70%;left:46%;margin-top:-41px;margin-left:-34px}.wp .page-template-unsubscribe #subscriptionBlogs,.wp .page-template-unsubscribe #subscriptionEducational,.wp .page-template-unsubscribe #subscriptionEvents,.wp .page-template-unsubscribe #subscriptionNewsletter,.wp .page-

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template-unsubscribe #subscriptionProductUpdates,.wp .page-template-unsubscribe #Unsubscribed,.wp .page-
template-unsubscribe form.mktoForm input#subscriptionWebinars{height:0}.wp .page-template-unsubscribe
.section_preference_center form.mktoForm .mktoButtonWrap.mktoRound
.mktoButton{width:168px;height:48px;border-radius:100px;background-color:#4698cb;transition:all .3s
ease;float:left;margin-bottom:120px}.wp .page-template-unsubscribe .UnsubscribedReason--
hide{display:none!important}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow .mktoFormCol:first-
child:nth-last-child(3){width:15%;float:left}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow
.mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol{width:58%}.wp .page-template-unsubscribe
form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol
strong{display:block;margin-top:6px;position:relative}.wp .page-template-unsubscribe
[for=Unsubscribed]:after,.wp .page-template-unsubscribe
[for=UnsubscribedReason]:after{content:"";display:none!important}.wp .page-template-unsubscribe
.switch{position:relative;display:inline-block;width:50px;height:28px;margin-left:0!important}.wp .page-template-
unsubscribe .mktoForm input[type=checkbox]+label:before,.wp .page-template-unsubscribe .switch
input{display:none}.wp .page-template-unsubscribe
.slider{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.wp .page-template-unsubscribe
.slider:before{position:absolute;content:"";height:28px;width:28px;background-color:#fff;transition:.4s;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25)}.wp .page-template-unsubscribe input:focus+.slider{box-shadow:0 0 1px
#2196f3}.wp .page-template-unsubscribe input:checked+.slider:before{background-color:#4698cb;-ms-
transform:translateX(26px);transform:translateX(26px)}.wp .page-template-unsubscribe .slider.round{border-
radius:34px}.wp .page-template-unsubscribe .slider.round:before{border-radius:50%}.wp .page-template-
unsubscribe .update_message{float:left;margin-top:100px!important;margin-bottom:120px!important;margin-
left:25px!important;font-family:MarkOT;font-size:12px;font-weight:300;font-style:normal;font-stretch:normal;line-
height:1.67;letter-spacing:.2px;text-align:left;color:#8e9093}@media only screen and (max-width:760px) and (min-
width:479px){.wp .page-template-unsubscribe form.mktoForm .mktoHtmlText{margin-left:25px}}@media only
screen and (max-width:400px){.wp .page-template-unsubscribe form.mktoForm
.mktoFieldWrap{width:350px!important}.wp .page-template-unsubscribe
hr{height:1px!important;padding:1px!important}.wp .page-template-unsubscribe .gdpr-video
a.play_btn{top:88%;width:30px}.wp .page-template-unsubscribe .mktoForm div
.marketo_video_container{padding-top:20px}}@media only screen and (max-width:697px){.wp .page-template-
unsubscribe .section_preference_center .mktoForm .mktoFormRow{width:100%}}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFieldDescriptor{float:none;width:100%}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow{display:block;float:none;width:100%}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 input{height:auto!important;opacity:1!important}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFieldWrap{width:100%!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 div.mktoLogicalField{width:auto!important}.wp .page-
template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFieldWrap label,.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(5)
.mktoHtmlText{width:100%!important}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7){margin-top:86px;padding-top:86px;border-top:5px solid
#dce0e4}@media only screen and (min-width:768px){.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7){display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-
content:space-between}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7) .mktoFieldDescriptor{width:50%}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFormCol:nth-
child(2){display:none}}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386

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.mktoFormRow:nth-child(7) .mktoFieldDescriptor .mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-
direction:row-reverse;flex-direction:row-reverse}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFieldDescriptor .mktoFieldWrap label{display:block;margin-
bottom:40px;position:relative;top:-2px}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13){display:-ms-flexbox;display:flex;-ms-flex-
pack:start;justify-content:flex-start}@media only screen and (min-width:768px){.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13){float:left;width:50%}}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b{padding:0!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFormCol b span{color:#4a4a4a;font-size:24px!important;font-weight:700;line-height:1.58;letter-
spacing:.7px;padding-top:0}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b+span{color:#4a4a4a;display:block;font-
size:16px!important;font-weight:300;line-height:30px;margin-bottom:40px}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFieldDescriptor{position:relative;padding-right:24px;width:auto}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFormCol{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(14){clear:both}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(15){display:-ms-flexbox;display:flex;margin-top:40px}.wp .page-
template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
h1{color:grey!important;font-size:16px!important;font-weight:400!important;letter-spacing:2px!important;text-
transform:uppercase}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldDescriptor{position:relative;width:auto!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap
label{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldWrap>label,.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label .slider.round{display:none!important}.wp
.page-template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
.mktoFieldWrap label input{display:block!important;margin:0!important}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
.mktoFormCol{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldWrap .mktoHtmlText{width:100%!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap
h1{padding:0!important;width:100%!important}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(16) label:after{left:175px}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoButtonWrap.mktoRound .mktoButton{margin:60px 0
100px;width:auto!important}.wp .page-template-unsubscribe .unsubscribe-title.small{font-size:14px;font-
weight:700}.wp .page-template-unsubscribe #UnsubscribedReason{height:48px;font-size:16px;font-
weight:300;line-height:2!important;letter-spacing:.2px;text-align:left;color:#4a4a4a;padding:8px
12px!important;border:1px solid #a7a7a8!important;background-color:#fff;border-radius:2px;margin-
bottom:30px}.wp .page-template-unsubscribe .mktoForm .mktoAsterix{display:block}.wp .page-template-
unsubscribe .unsubscribe-reason-wrapper{margin-bottom:20px}.wp .page-template-unsubscribe .unsubscribe-
reason-wrapper .mktoField{float:none;font-size:inherit;line-height:inherit}.wp .page-template-unsubscribe
.unsubscribe-reason-wrapper .mktoField>div{padding:6px 15px;height:48px;max-width:none;border-
width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a}.wp .page-template-unsubscribe
.unsubscribe-reason-wrapper .mktoField>div>div:last-child{max-width:none;top:47px;border-width:1px;border-
color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a;width:calc(100% + 2px);left:-1px}.wp .page-template-

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unsubscribe .unsubscribe-reason-wrapper .mktoField>div .icon{margin-right:15px}.wp .get-subscription-template .header-two{font-size:24px;font-weight:400;margin-bottom:100px;line-height:32px;padding-bottom:0}.wp .get-subscription-template #ThankYouRedirect{display:none}.wp .get-subscription-template .image{height:90px}.wp .get-subscription-template .content{height:120px}.wp .get-subscription-template .item{min-height:340px}.wp .get-subscription-template #mktoForm\_1051 .mktoButtonRow button{border:none}.style-module--item--3bS8-{min-height:340px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}.style-module--button--1YC3d{-ms-flex-item-align:start;align-self:flex-start}@font-face{font-family:IsidoraSans-Medium;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-Medium.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-MediumIt;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-MediumIt.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-Regular;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-Regular.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-SemiBold;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-SemiBold.woff) format("woff");font-style:normal}.wp .page-livestream .video-container{margin-top:60px}.wp .page-livestream .cnfl a{font-size:12px;color:#257bd7;transition:all .3s ease-in-out;text-decoration:none!important}.wp .page-livestream .cnfl a:hover{opacity:.6}.wp .page-livestream .title-arrow{width:20px;height:20px;display:inline-block;position:absolute;top:0;left:120px;top:24px}.wp .page-livestream .title-arrow:after,.wp .page-livestream .title-arrow:before{content:"";position:absolute;background-color:#8e9093;width:15px;height:1px;transition:all .4s cubic-bezier(1,.07,.28,1.04)}.wp .page-livestream .title-arrow:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.wp .page-livestream .title-arrow:after{-ms-transform:rotate(-45deg);transform:rotate(-45deg);left:11px}.wp .page-livestream .expanded .title-arrow:before{-ms-transform:rotate(135deg);transform:rotate(135deg)}.wp .page-livestream .expanded .title-arrow:after{-ms-transform:rotate(-135deg);transform:rotate(-135deg)}.wp .page-livestream .error,.wp .page-livestream .error+.checkmark{border-color:#df2d58!important}.wp .page-livestream .br-4{border-radius:4px}.wp .page-livestream .fz-12{font-size:12px}.wp .page-livestream .light-black{color:rgba(0,0,0,.7)}.wp .page-livestream .bg-white{background-color:#fff}.wp .page-livestream .uppercase{text-transform:uppercase}.wp .page-livestream .rebrand-cloud-color{color:#9678ff}.wp .page-livestream .rebrand-platform-color{color:#5d80eb}.wp .page-livestream .cnfl-input::-webkit-input-placeholder{text-transform:uppercase}.wp .page-livestream .cnfl-input::-webkit-input-placeholder,.wp .page-livestream .cnfl-input::placeholder{text-transform:uppercase}.wp .page-livestream .cnfl-input:-moz-placeholder,.wp .page-livestream .cnfl-input:-ms-input-placeholder,.wp .page-livestream .cnfl-input::-moz-placeholder{text-transform:uppercase}.wp .page-livestream input.valid,.wp .page-livestream input.valid+.checkmark{border-color:#ecef2!important}.wp .page-livestream .cnfl-input{-webkit-appearance:none;letter-spacing:1px;border:1.1px solid #ecef2;padding:10px 0 10px 25px;margin-bottom:5px;font-size:12px;border-radius:4px;background:#fff;width:100%}.wp .page-livestream .cnfl-input-wrapper{width:100%;display:inline-block}.wp .page-livestream .cnfl-input-wrapper.cnfl-width-50{width:calc(50% - 5px)}.wp .page-livestream .cnfl-input-wrapper label{display:none}.wp .page-livestream div.cnfl-select{text-transform:uppercase;text-align:left;color:rgba(0,0,0,.7);position:relative;padding:0;border-bottom:0;border-bottom-left-radius:0;border-bottom-right-radius:0}.wp .page-livestream div.cnfl-select>div{padding:0 10px}.wp .page-livestream div.cnfl-select .options-container{position:absolute;left:-1px;right:-2px;z-index:9;background:#fff;border-right:1.1px solid #ecef2;border-left:1.1px solid #ecef2;border-bottom:1.1px solid #ecef2;top:44px;transition:max-height .5s ease-in-out;overflow:hidden;max-height:0;border-bottom-left-radius:4px;border-bottom-right-radius:4px;border-top-left-radius:0;border-top-right-radius:0}.wp .page-livestream div.cnfl-select.error .options-container{border-right-color:#df2d58;border-left-color:#df2d58;border-bottom-color:#df2d58}.wp .page-livestream div.cnfl-select.expanded .options-container{max-height:220px}.wp .page-livestream div.cnfl-select>div:first-child{padding:10px 0 10px 25px;cursor:pointer}.wp .page-livestream div.cnfl-select .title-arrow{right:20px;left:auto}.wp .page-livestream div.cnfl-select .option{margin-bottom:10px;padding:10px 10px 20px;background:#edf0f5;position:relative}.wp .page-livestream div.cnfl-select

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.divider{position:absolute;top:-20px;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);border:3px solid #fff;width:30px;height:30px;text-align:center;border-radius:50%;background:#f7f9fc;font-
weight:700;text-transform:uppercase}.wp .page-livestream div.cnfl-select .option ul{display:-ms-
flexbox;display:flex;margin:0;list-style:none;padding:0}.wp .page-livestream div.cnfl-select .option
li{background:#fff;-ms-flex:1 1;flex:1 1;text-align:center;border:1px solid #e3e4e5;border-radius:4px;font-
size:12px;text-transform:uppercase;font-weight:300;letter-spacing:1px;color:#000;margin:0 10px 0 0;padding:10px
0;cursor:pointer}.wp .page-livestream div.cnfl-select .option li:hover{background-
color:rgba(37,123,215,.5);color:#fff;font-weight:500}.wp .page-livestream div.cnfl-select .option
li.selected{background-color:#257bd7;color:#fff;font-weight:500}.wp .page-livestream div.cnfl-select .option
li:last-child{margin-right:0}.wp .page-livestream div.cnfl-select h6{font-size:12px;text-align:center;margin:10px
0;color:#000;font-weight:500}.wp .page-livestream .checkbox-container{display:block;position:relative;padding-
left:35px;margin-bottom:12px;cursor:pointer;-webkit-user-select:none;-moz-user-select:none;-ms-user-
select:none;user-select:none;text-align:left}.wp .page-livestream .embed-form-checkbox{cursor:pointer;line-
height:1.5}.wp .page-livestream .checkbox-container
input{position:absolute;opacity:0;cursor:pointer;height:0;width:0}.wp .page-livestream
.checkmark{position:absolute;top:0;left:0;height:25px;width:25px;border:1.1px solid #e3e4e5;transition:all .2s ease-
in-out}.wp .page-livestream .checkmark:after{content:"";position:absolute;display:none}.wp .page-livestream
.checkbox-container input:checked~.checkmark:after{display:block}.wp .page-livestream .checkbox-container
.checkmark:after{left:9px;top:5px;width:5px;height:10px;border-color:#ff6620;border-style:solid;border-width:0
2px 2px 0;-ms-transform:rotate(45deg);transform:rotate(45deg)}.wp .page-livestream .cnfl-
button{border:none;border-radius:4px;background-color:#ff6620;color:#fff;padding:10px 20px;font-
size:13px;transition:all .3s ease-in-out;display:inline-block;letter-spacing:1px;text-transform:uppercase}.wp .page-
livestream .cnfl-button span{color:#fff}.wp .page-livestream .cnfl-button:hover{-ms-
transform:scale(1.03);transform:scale(1.03);opacity:.6}.wp .page-livestream .cnfl-button-secondary-outline{border-
radius:4px;background-color:#fff;border:1px solid #00004b;color:#00004b;padding:10px 20px;font-size:14px;font-
weight:500}.wp .page-livestream .cnfl-link-item{color:#257bd7}.wp .page-livestream .title-container{text-
align:center}.wp .page-livestream .title-with-line{padding-bottom:0;font-size:50px;font-
weight:300;position:relative;padding-top:25px}.wp .page-livestream .title-with-
line:before{content:"";width:40px;height:.1px;border-style:solid;border-width:2px;border-image-source:linear-
gradient(270deg,#80c0ec,#257bd7);border-image-slice:1;background-image:linear-
gradient(270deg,#80c0ec,#257bd7);position:absolute;left:50%;-ms-transform:translateX(-
50%);transform:translateX(-50%);margin-bottom:24px;top:0}.wp .page-livestream .rebrand-h3{font-size:28px;font-
weight:300;color:#000;padding:0}.wp .page-livestream .rebrand-h5{font-size:18px;font-weight:700;padding:0}.wp
.page-livestream .rebrand-h6{font-size:16px;font-weight:500;color:#2a2a2d}.wp .page-livestream .cnfl .gs-tooltip
.tooltip-icon{display:inline-block;position:relative;vertical-align:top}.wp .page-livestream .cnfl .gs-tooltip .tooltip-
icon span{border-radius:20px;border:1px solid #8e9093;color:#8e9093;font-family:MarkOT;font-
size:12px;padding:0 6px}.wp .page-livestream .cnfl .tooltip-hidden{background:#fff;border:1px solid #eee;box-
shadow:0 0 15px 0 rgba(70,152,203,.15);visibility:hidden;position:absolute;top:0;left:-20px;margin:30px 5px
5px;padding:10px;width:300px;z-index:2}.wp .page-livestream .cnfl .gs-tooltip .tooltip-icon:hover .tooltip-
hidden{visibility:visible}.wp .page-livestream .cnfl .gs-tooltip .tooltip-
hidden:before{content:"";display:block;position:absolute;top:-8px;left:14px;width:0;height:0;border-left:10px solid
transparent;border-right:10px solid transparent;border-bottom:10px solid #fff}.wp .page-livestream .cnfl .gs-
tooltip{position:relative}.wp .page-livestream .cnfl .tooltiptext{font-size:12px}.wp .page-livestream .cnfl .gs-tooltip
.tooltip-icon span{font-size:10px;padding:0 4px}.wp .page-livestream .cnfl .gs-tooltip .tooltip-hidden
.tooltiptext{margin-bottom:0}@media screen and (max-width:768px){.wp .page-livestream .title-with-line{line-
height:1}}@media screen and (min-width:992px){.wp .page-livestream .cnfl-last-row{margin-bottom:0}}@media
screen and (min-width:768px) and (max-width:992px){.wp .page-livestream div.cnfl-select .options-
container{overflow-y:scroll}.wp .page-livestream .cnfl-input.cnfl-select span{font-size:10px}}@media screen and

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(max-width:992px){.wp .page-livestream .cnfl .gs-tooltip .tooltip-hidden.tooltip-push-left{left:-224px}.wp .page-
livestream .cnfl .gs-tooltip .tooltip-hidden.tooltip-push-left:before{left:212px}}.wp .oem-program,.wp .verified-
program{margin-top:40px}.wp .oem-program li,.wp .oem-program p,.wp .verified-program li,.wp .verified-program
p{color:#505050;font-size:16px;line-height:1.63;font-weight:400}.wp .oem-program ul,.wp .verified-program
ul{padding:0 0 0 20px;margin:0 0 20px}.wp .oem-program img,.wp .verified-program img{margin:0}.wp .oem-
program .content,.wp .verified-program .content{padding:40px 0}.wp .oem-program .content.bb,.wp .verified-
program .content.bb{border-bottom:1px solid #c2c2c2}.wp .oem-program h1,.wp .verified-program
h1{color:#fff;font-size:37px;padding:0}.wp .oem-program h2,.wp .verified-program h2{color:#fff;font-
size:20px;line-height:1.3;padding:0;margin:20px 0 40px}.wp .oem-program h3,.wp .verified-program
h3{color:#454545;font-size:36px;font-weight:400;padding:0;margin:0 0 30px}.wp .oem-program h4,.wp .verified-
program h4{color:#505050;font-size:18px;font-weight:700;padding:0;margin:20px 0;line-height:1.2}.wp .oem-
program .mb-20,.wp .verified-program .mb-20{margin-bottom:20px}.wp .oem-program #mktoForm_3911
.mktoButton,.wp .oem-program #mktoForm_4028 .mktoButton,.wp .oem-program .button,.wp .verified-program
#mktoForm_3911 .mktoButton,.wp .verified-program #mktoForm_4028 .mktoButton,.wp .verified-program
.button{display:inline-block;padding:15px 30px;border-radius:8px;text-transform:uppercase;font-size:15px;letter-
spacing:1px;font-weight:700;background:#173361;color:#fff;border:2px solid #173361}.wp .oem-program
.button:hover,.wp .verified-program .button:hover{background:#fff;color:#173361;border-color:#173361}.wp .oem-
program .img-wrapper:not(.non-icon),.wp .verified-program .img-wrapper:not(.non-icon){height:95px}.wp .oem-
program .img-wrapper img,.wp .verified-program .img-wrapper
img{margin:0;width:auto;height:100%;position:relative;left:50%;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.wp .oem-program .img-wrapper .infographic,.wp .verified-program .img-
wrapper .infographic{background-position:50%;background-repeat:no-repeat}.wp .oem-program .img-wrapper
.infographic1,.wp .verified-program .img-wrapper .infographic1{background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/verified-integration-program/infographic1.png);height:318px;background-
size:contain}.wp .oem-program .img-wrapper .infographic2,.wp .verified-program .img-wrapper
.infographic2{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/verified-
integration-program/infographic2.png);height:466px;background-size:contain}@media (-webkit-min-device-pixel-
ratio:2),(min-resolution:192dpi){.wp .oem-program .img-wrapper .infographic1,.wp .verified-program .img-wrapper
.infographic1{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/verified-
integration-program/infographic1_2x.png)}.wp .oem-program .img-wrapper .infographic2,.wp .verified-program
.img-wrapper .infographic2{background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/verified-integration-program/infographic2_2x.png)}}.wp .oem-program
.content-info .row,.wp .verified-program .content-info .row{display:-ms-flexbox;display:flex;-ms-flex-
direction:row;flex-direction:row}.wp .oem-program .content-info.content-reverse .row,.wp .verified-program
.content-info.content-reverse .row{-ms-flex-direction:row-reverse;flex-direction:row-reverse}.wp .oem-program
#mktoForm_3911,.wp .oem-program #mktoForm_4028,.wp .verified-program #mktoForm_3911,.wp .verified-
program #mktoForm_4028{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}.wp .oem-
program #mktoForm_3911 .mktoFormRow,.wp .oem-program #mktoForm_4028 .mktoFormRow,.wp .verified-
program #mktoForm_3911 .mktoFormRow,.wp .verified-program #mktoForm_4028 .mktoFormRow{-ms-flex:1 0
48%;flex:1 0 48%;margin-bottom:20px;margin-right:2%;background:none}.wp .oem-program #mktoForm_3911
.mktoButtonRow,.wp .oem-program #mktoForm_4028 .mktoButtonRow,.wp .verified-program #mktoForm_3911
.mktoButtonRow,.wp .verified-program #mktoForm_4028 .mktoButtonRow{position:absolute;bottom:0;left:50%;-
ms-transform:translateX(-50%);transform:translateX(-50%)}.wp .oem-program .connector>div:first-child,.wp
.verified-program .connector>div:first-child{height:230px}.wp .oem-program .verified-connectors a,.wp .verified-
program .verified-connectors a{display:inline-block;margin:0 20px 20px 0;max-width:150px}.wp .oem-program
.verified-connectors .img-wrapper,.wp .verified-program .verified-connectors .img-wrapper{text-align:center}.wp
.oem-program .connector-benefit .blurb h4,.wp .verified-program .connector-benefit .blurb h4{height:45px}.wp
.oem-program .connector-benefit .blurb p,.wp .verified-program .connector-benefit .blurb p{height:130px}@media

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(min-width:768px) and (max-width:1199px){.wp .oem-program .connector-benefit .blurb p,.wp .verified-program
.connector-benefit .blurb p{height:85px}}@media (max-width:767px){.wp .oem-program .blurb h4,.wp .oem-
program .blurb p,.wp .verified-program .blurb h4,.wp .verified-program .blurb p{height:auto!important}.wp .oem-
program .blurb p,.wp .verified-program .blurb p{margin-bottom:40px!important}.wp .oem-program .connector-
benefit img,.wp .oem-program .verification-process img,.wp .verified-program .connector-benefit img,.wp .verified-
program .verification-process img{position:relative;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%)}.wp .oem-program .blurb,.wp .verified-program .blurb{text-align:center}.wp .oem-program
.connector>div:first-child,.wp .verified-program .connector>div:first-child{height:auto;margin-
bottom:40px}}@media (max-width:991px){.wp .oem-program #mktoForm_3911 .mktoFormRow,.wp .oem-
program #mktoForm_4028 .mktoFormRow,.wp .verified-program #mktoForm_3911 .mktoFormRow,.wp .verified-
program #mktoForm_4028 .mktoFormRow{-ms-flex-preferred-size:100%;flex-basis:100%}.wp .oem-program
#mktoForm_3911 .mktoButtonRow,.wp .oem-program #mktoForm_4028 .mktoButtonRow,.wp .verified-program
#mktoForm_3911 .mktoButtonRow,.wp .verified-program #mktoForm_4028 .mktoButtonRow{bottom:75px}.wp
.oem-program .button-wrapper,.wp .verified-program .button-wrapper{text-align:center;margin-bottom:20px}.wp
.oem-program .content,.wp .verified-program .content{padding:0 0 20px}.wp .oem-program .content-info .row,.wp
.verified-program .content-info .row{-ms-flex-direction:column-reverse;flex-direction:column-reverse;-ms-flex-
pack:center;justify-content:center}.wp .oem-program .content-info.content-reverse .row,.wp .verified-program
.content-info.content-reverse .row{-ms-flex-direction:column;flex-direction:column}.wp .oem-program
.content.bb,.wp .oem-program .img-wrapper.non-icon,.wp .verified-program .content.bb,.wp .verified-program .img-
wrapper.non-icon{margin-bottom:40px}}.wp .oem-program #sign-up{margin-bottom:40px}@media (max-
width:991px){.wp .oem-program .content{padding:0 0 20px}}.wp .verified-program .img-wrapper.non-icon
img{height:auto}.solutions-module--container--2CFNs section.solutions-module--grid2--3MgK5
ul.items,.solutions-module--container--2CFNs section.solutions-module--grid3--3Zuny ul.items,.solutions-module-
container--2CFNs section.solutions-module--grid4--3Iiba ul.items{display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.solutions-module--container--
2CFNs section.solutions-module--grid2--3MgK5 ul.items>li{background-color:#e6f5fb;width:100%}.solutions-
module--container--2CFNs section.solutions-module--grid2--3MgK5 ul.items>li h3,.solutions-module--container--
2CFNs section.solutions-module--grid2--3MgK5 ul.items>li li{color:#173361}@media screen and (min-
width:760px){.solutions-module--container--2CFNs section.solutions-module--grid2--3MgK5
ul.items>li{width:49%}}.solutions-module--container--2CFNs section.solutions-module--grid3--3Zuny
ul.items>li{width:100%}@media screen and (min-width:640px){.solutions-module--container--2CFNs
section.solutions-module--grid3--3Zuny ul.items>li{width:33%}}.solutions-module--container--2CFNs
section.solutions-module--grid4--3Iiba ul.items>li{width:100%}@media screen and (min-width:992px){.solutions-
module--container--2CFNs section.solutions-module--grid4--3Iiba ul.items>li{-ms-flex:1 1;flex:1 1}}@media
screen and (min-width:480px){.solutions-module--container--2CFNs section.solutions-module--grid4--3Iiba
ul.items>li{width:49%}}.solutions-module--container--2CFNs li svg{margin-
bottom:40px;width:60px;height:60px}.wp .stay-in-touch-wrapper .contact_form_section{padding:80px 0}.wp .stay-
in-touch-wrapper .contact_form_section .container{max-width:500px;text-align:left}.wp .stay-in-touch-wrapper
.stay-in-touch-input{width:100%;font-family:MarkOT;font-weight:400;border:0;font-size:16px;outline:0;line-
height:1.3;padding:20px!important;color:#999;border-bottom:1px solid
#a7a7a8;background:#f6f6f6!important;border:#a7a7a8!important;box-shadow:none!important}.wp .stay-in-touch-
wrapper .stay-in-touch-input:first-of-type{border-bottom:1px solid #a7a7a8!important}.wp .stay-in-touch-wrapper
.stay-in-touch-button{background:#4597cb;color:#fff;border:0;width:100%;padding:15px 20px}.wp .stay-in-touch-
wrapper .stay-in-touch-button div{text-align:center}.subscribe-to-sub-processor-updates-module--page--2vBIP
.section.subscribe-to-sub-processor-updates-module--form--2Us-Y{min-height:408px}.subscribe-to-sub-processor-
updates-module--page--2vBIP .subscribe-to-sub-processor-updates-module--thankyou--
2NBgk{position:absolute;top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-
50%);transition:all .3s ease;font-size:18px}.style-module--container--o7cqV .image-animation{border-

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radius:8px}.style-module--container--o7cqV .cta-links-section{padding-top:30px}.style-module--container--o7cqV .cta-links-section .style-module--title--1SscH p{margin-bottom:2px}.style-module--container--o7cqV .style-module--ctaWrap--w3EQ9{padding-top:0}.style-module--row--21104{position:relative}.style-module--ctaLinksSection--6nbxU{padding:80px 0;background:#fafafa}.style-module--colSm3--3LKvo{left:auto!important;right:0!important;width:35%!important}.style-module--colSm3--3LKvo img{max-width:100%!important}.style-module--imageWrapper--1hLWR{position:relative}.style-module--imageWrapper--1hLWR .play\_btn{left:50%!important;top:50%!important;-ms-transform:translate(-50%,-30%);transform:translate(-50%,-30%);margin-left:0!important;margin-top:0!important}.style-module--formCloudSignUpModal--1AQ3A .style-module--thankyou--32jb6{font-weight:500;margin-top:20px;text-align:center}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt{text-align:center}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt h4{display:inline-block;font-size:20px;color:#8e9093;padding:0;line-height:52px;font-weight:500}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt>p,.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt h6{font-size:16px}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form .style-module--buttonContainer--pKinf{width:100%;margin:20px 0}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form>input{width:49%}@media screen and (max-width:992px){.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form>input{width:100%}}.style-module--checkboxWrapper--3sEqj{position:relative;width:100%;margin-top:20px;color:rgba(0,0,0,.7);text-align:left}.style-module--checkboxWrapper--3sEqj input{position:absolute;opacity:0;cursor:pointer;height:0;width:0}.style-module--checkboxWrapper--3sEqj label{cursor:pointer;padding-left:30px}.style-module--checkboxWrapper--3sEqj .style-module--checkboxContainer--1foY9{display:block;position:relative;padding-left:35px;margin-top:12px;-webkit-user-select:none;-moz-user-select:none;-ms-user-select:none;user-select:none}.style-module--errorContainer--3beGu{position:absolute;top:0;border:1px solid #df2d58;font-size:14px;padding:15px 50px;width:100%;background-color:#fff;transition:all .2s ease-in-out;opacity:0;visibility:hidden;border-radius:4px;text-align:center;z-index:10}.style-module--errorContainer--3beGu p{text-align:center;font-size:13px;color:#df2d58}.style-module--errorContainer--3beGu.style-module--show--3nUPD{opacity:1;visibility:visible}.style-module--existingAccount--3qZ8p{margin-bottom:20px}.style-module--existingAccount--3qZ8p a{letter-spacing:1px;margin-right:0;font-weight:500;color:#257bd7;font-size:12px}.style-module--tos--2owUx{font-size:12px}.style-module--tos--2owUx p{font-size:12px;width:80%;line-height:1.4;color:rgba(0,0,0,.7);text-align:justify;margin:auto auto 15px}.style-module--tosUS--FgYmU,.style-module--us--1yRjm .style-module--tos--2owUx{display:none}.style-module--us--1yRjm .style-module--tosUS--FgYmU{display:block}.modal-is-visible .style-module--formCloudSignUpModal--1AQ3A.style-module--show--3nUPD{top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-50%)}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-direction:row-reverse;flex-direction:row-reverse;-ms-flex-align:center;align-items:center}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap label,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap label{display:block;-ms-flex:1 1;flex:1 1}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap .mktoCheckboxList,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap .mktoCheckboxList{width:25px!important;margin-right:10px;padding:5px 0}.style-module--form--3BUsB .mktoForm input[type=checkbox]+label:before{border:1px solid #173361;border-radius:2px;-webkit-appearance:none;-moz-appearance:none;appearance:none;height:14px;width:14px;outline:0;box-shadow:none}.style-module--form--3BUsB .mktoForm input[type=checkbox]:checked+label:before{background:#173361}.style-module--wp--1dpxq{-webkit-

appearance:none;letter-spacing:1px;border:1.1px solid #eceff2;padding:10px 0 10px 25px;margin-bottom:5px;font-size:12px;font-weight:400;border-radius:4px;background:#fff;box-shadow:none;line-height:inherit;width:100% }.style-module--wp--1dpxq.style-module--error--2WcVI{border:1px solid #df2d58}.style-module--sectionContent--3CzBg{background-color:transparent;border-radius:8px;background:hsla(0,0%,96.1%,.85);text-align:center;padding:100px 0;margin:0 25px 25px}@media screen and (max-width:767px){.style-module--sectionContent--3CzBg{border-radius:0;margin-left:0;margin-right:0;padding-top:50px;padding-bottom:50px}}.style-module--sectionContent--3CzBg:last-child{margin-bottom:0}.style-module--sectionContent--3CzBg.style-module--robinsEgg--1TK5a{background:#b4e1e4}.style-module--sectionContent--3CzBg.style-module--ice--kDgc2{background:#e6f5fb}.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe{margin:0 auto;max-width:1170px;padding-left:15px;padding-right:15px;width:100%}@media screen and (min-width:768px) and (max-width:991px){.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe.style-module--noBackground--2v\_Ea{padding-left:0;padding-right:0}}@media screen and (min-width:992px) and (max-width:1199px){.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe.style-module--noBackground--2v\_Ea{padding-left:0;padding-right:0}}.style-module--sectionContent--3CzBg .style-module--svg--1POtP{width:40px}.style-module--sectionContent--3CzBg .style-module--paragraph--3Uuc4{width:35%;margin:0 auto;line-height:1.63;color:#000;font-size:18px;font-weight:300}.style-module--sectionContent--3CzBg .style-module--title--1sbHU{text-align:center;margin-bottom:50px}.style-module--sectionContent--3CzBg .style-module--title--1sbHU h3{color:#000;font-size:28px;font-weight:500;padding:0}.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh{margin:100px auto 0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (max-width:575px){.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh>:not(:first-child){margin-left:20px}@media screen and (max-width:575px){.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh>:not(:first-child){margin-top:20px;margin-left:0}}@media (max-width:768px){.style-module--sectionContent--3CzBg .style-module--paragraph--3Uuc4{width:90%}.style-module--sectionContent--3CzBg h2{line-height:1}}.rules-of-engagement-module--codeOfConduct--1\_ejT p{font-weight:700;font-size:18px}.rules-of-engagement-module--sectionSummary--1qeSs{margin-bottom:100px}.rules-of-engagement-module--wrapper--1eCh6{border:2px solid hsla(0,0%,96.1%,.85);border-radius:8px;padding:20px;text-align:left;margin:10px 0}.rules-of-engagement-module--wrapper--1eCh6 div,.rules-of-engagement-module--wrapper--1eCh6 h4,.rules-of-engagement-module--wrapper--1eCh6 li,.rules-of-engagement-module--wrapper--1eCh6 ul{margin:20px 0}.rules-of-engagement-module--wrapper--1eCh6 h4{color:#173361;font-weight:700}.rules-of-engagement-module--disclaimer--Blzoi{font-weight:700}.rules-of-engagement-module--disclaimer--Blzoi span{color:#d8365d}.confluent-cloud-faqs-module--faqSection--3V0x1,.startup-program-faq-module--faqSection--142Xk{padding-top:25px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt ul{list-style:none;margin:0;padding:0}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt ul li:not(:last-child){margin-bottom:30px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt h4{color:#b78142;font-size:18px;font-weight:700;margin-bottom:20px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt h5{color:#000;font-size:12px;font-weight:500;letter-spacing:1.2px;line-height:24px;margin:0;text-transform:uppercase}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt strong{display:block}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt .support-module--desktop--1me3a{display:none}}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt .support-module--desktop--1me3a .support-module--row--1za5f{display:-ms-

flexbox;display:flex}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child){border-top:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child):last-child{border-bottom:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child)>div:first-child{border-left:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child)>div:last-child{border-right:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div{padding:20px 10px;width:20%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(2){width:14%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(3),.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(4),.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(5){width:22%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi{display:none;text-align:center}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi{display:block}}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi h4{font-size:24px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f{border-bottom:2px solid hsla(0,0%,96.1%,.85);padding:40px 0 20px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f:last-child{border-bottom-width:7px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f>div:first-child{margin-bottom:20px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 h2{margin-bottom:50px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt p{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt>p{margin-bottom:80px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2{background:#fff;display:-ms-flexbox;display:flex;margin:0 0 10px;padding:50px 30px;text-align:left;width:calc(50% - 5px);-ms-flex:none!important;flex:none!important}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2{width:100%}}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:first-child{margin-right:20px;width:30px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-

module--itemContainer--\_ZvPa>div:first-child svg{ width:100% }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child{-ms-flex:1 1;flex:1 1 }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child h4{margin:0 0 15px }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child h4 a{color:#000;font-size:18px;font-weight:700}.covid-19-faq-module--page--110ut .covid-19-faq-module--hero--1wWkF .covid-19-faq-module--content--17\_we{width:90%}.covid-19-faq-module--page--110ut .covid-19-faq-module--hero--1wWkF .covid-19-faq-module--content--17\_we p{color:#000;margin-top:50px}.covid-19-faq-module--page--110ut .covid-19-faq-module--introSection--30To6{color:#000;font-size:14px;font-weight:300;text-align:left;padding-bottom:0}.covid-19-faq-module--page--110ut .covid-19-faq-module--introSection--30To6 li{margin:20px 0}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN{text-align:left}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we{margin-bottom:50px}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we h4{color:#173361;font-size:18px;font-weight:700}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we p{color:#000;font-size:14px;font-weight:300}.request-kafka-tco-assessment-module--formSection--64K9s h3,.request-kafka-tco-assessment-module--formSection--64K9s p,.request-kafka-tco-assessment-module--formSection--64K9s ul{color:#173361;font-weight:700;font-size:18px }.request-kafka-tco-assessment-module--formSection--64K9s h3{width:60%;font-weight:500;font-size:28px;margin:0 auto 50px }.request-kafka-tco-assessment-module--formSection--64K9s p,.request-kafka-tco-assessment-module--formSection--64K9s ul{list-style:none }.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww{width:800px;max-width:95%;margin:25px auto}@media screen and (min-width:768px){.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap }}.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww input{width:100%;margin:5px 0}@media screen and (min-width:768px){.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww .request-kafka-tco-assessment-module--select---gaxw,.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww input{width:calc(50% - 10px);margin:5px }}.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww .request-kafka-tco-assessment-module--select---gaxw:last-of-type{width:100%;margin-bottom:25px }.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--thankYou--2eESF{margin-top:50px;font-size:24px }.style-module--postItem--3UA1F{display:-ms-flexbox;display:flex;-ms-flex-align:start;align-items:flex-start;margin-bottom:65px;text-align:left}@media screen and (max-width:767px){.style-module--postItem--3UA1F{-ms-flex-direction:column;flex-direction:column }}.style-module--postItem--3UA1F ul{list-style:none;padding:0;margin:0}.style-module--postItem--3UA1F.style-module--protected--2LnYL h2:before{content:"\1F512"}.style-module--postItem--3UA1F .style-module--imageContainer--1coFo{margin-right:55px;max-width:378px;width:100% }.style-module--postItem--3UA1F .style-module--imageContainer--1coFo img{width:100% }.style-module--postItem--3UA1F .style-module--content--2cWa9{-ms-flex:1 1;flex:1 1 }.style-module--postItem--3UA1F .style-module--content--2cWa9 h2{margin:10px 0 20px }.style-module--postItem--3UA1F .style-module--content--2cWa9 h2 a{color:#0074a2;font-size:18px;font-weight:700}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb{color:#0074a2;font-size:14px;font-weight:500;margin-bottom:10px;display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-

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content:flex-start;-ms-flex-wrap:wrap;flex-wrap:wrap}.style-module--postItem--3UA1F .style-module--content--
2cWa9 .style-module--metadata--dt9Hb time{color:rgba(0,0,0,.85);font-weight:300;margin-right:10px}.style-
module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb .style-module--
tagContainer--3Xdt8 li{display:inline-block}.style-module--postItem--3UA1F .style-module--content--2cWa9
.style-module--metadata--dt9Hb .style-module--tagContainer--3Xdt8 li:not(:last-child):after{content:" ";margin-
right:2px}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb .style-
module--tagContainer--3Xdt8 li a{color:#0074a2}.style-module--postItem--3UA1F .style-module--content--2cWa9
.style-module--summary--2CPjk{color:rgba(0,0,0,.85);font-size:16px;font-weight:400;line-height:1.79}.style-
module--listHeader--2FIuN{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-
pack:justify;justify-content:space-between;-ms-flex-align:center;align-items:center;margin-bottom:40px}@media
screen and (max-width:767px){.style-module--listHeader--2FIuN{-ms-flex-direction:column;flex-
direction:column}}.style-module--listHeader--2FIuN .style-module--categorySelector--
fjNB4{position:relative}@media screen and (max-width:767px){.style-module--listHeader--2FIuN .style-module--
categorySelector--fjNB4{margin-bottom:15px}}.style-module--listHeader--2FIuN .style-module--categorySelector--
-fjNB4:after{position:absolute;top:12px;right:13px;content:"";display:inline-block;-ms-
transform:rotate(135deg);transform:rotate(135deg);height:12px;width:12px;border-color:#0074a2;border-
style:solid;border-width:2px 2px 0 0}.style-module--listHeader--2FIuN .style-module--categorySelector--fjNB4
select{color:#173361;width:240px;padding:8px;height:40px;border:1px solid #173361;outline:0;border-
radius:6px;background-color:#fff;-webkit-appearance:none;-moz-
appearance:none;appearance:none;cursor:pointer}.style-module--listHeader--2FIuN .style-module--
buttonContainer--2bc55>:first-child{margin-right:10px}.style-module--searchResultHeader--3ERwZ{margin-
bottom:25px;text-align:left}.style-module--bottomBannerSection--
3t8WQ{background:hsla(0,0%,96.1%,.85)}@media print{.style-module--bottomBannerSection--
3t8WQ{display:none}}.style-module--bottomBannerSection--3t8WQ .style-module--content--2cWa9
p{color:#173361;font-size:28px;font-weight:500}.style-module--bottomBannerSection--3t8WQ .style-module--
content--2cWa9+div{margin:45px 0 0}.style-module--authors--3Ppc_{list-style:none;padding:0;margin:0;display:-
ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}.style-module--authors--3Ppc_ .style-module--author--
2AFBY{margin:10px 20px 0 0}.style-module--authors--3Ppc_ .style-module--author--2AFBY
a{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-
transform:uppercase}.style-module--authors--3Ppc_ .style-module--author--2AFBY
img{width:55px;height:55px;border-radius:50%;border:1px solid #979797;margin-right:10px}.style-module--
authors--3Ppc_ .style-module--author--2AFBY li{display:inline-block;margin-right:20px;margin-
bottom:15px}@media print{.style-module--relatedPostSection--2BQQq{display:none}}.style-module--
relatedPostSection--2BQQq .style-module--content--2cWa9{display:-ms-flexbox;display:flex;-ms-flex-
pack:justify;justify-content:space-between}@media screen and (max-width:767px){.style-module--
relatedPostSection--2BQQq .style-module--content--2cWa9{-ms-flex-direction:column;flex-
direction:column}}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--
FIMvV{-ms-flex:1 1;flex:1 1;margin-right:20px;margin-bottom:20px;text-align:left;display:-ms-
flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--relatedPostSection--2BQQq
.style-module--content--2cWa9 .style-module--post--FIMvV:last-child{margin-right:0}.style-module--
relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV img{max-
height:200px}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--
FIMvV h3 a{color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal}.style-module--
relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV .style-module--summary--
2CPjk{margin-bottom:20px;color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV
.style-module--author--2AFBY{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-
bottom:20px}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--

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FIMvV .style-module--metadata--dt9Hb{margin:auto 0 0}.style-module--sharePostSection--3GHmv{padding-top:0}@media print{.style-module--sharePostSection--3GHmv{display:none}}.style-module--sharePostSection--3GHmv h2{color:rgba(0,0,0,.85);font-size:28px;font-weight:500;margin:0 0 30px}@media screen and (max-width:767px){.style-module--sharePostSection--3GHmv h2{font-size:21px}}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe>div: hover svg{opacity:.5}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe>div:nth-of-type(2){margin:0 40px}.style-module--summary--2CPjk p:after{content:" [...]"}.style-module--blogList--2d8qC .style-module--bannerSection--1hj1f{background:hsla(0,0%,96.1%,.85);padding:30px 0;color:rgba(0,0,0,.85);font-size:14px;font-weight:300}.style-module--blogList--2d8qC .style-module--bannerSection--1hj1f a{color:#0074a2;font-weight:500}.style-module--blogList--2d8qC .style-module--mainSection--3uX12{padding-top:20px}.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn{background:#b4e1e4}.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn p{line-height:1.4;max-width:52rem;margin:0 auto}@media screen and (max-width:767px){.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn p{max-width:none}}.style-module--blogPost--1pOcN.style-module--protected--1y8oU .style-module--heroSection--eUZVN h1:before{content:"\1F512"}.style-module--blogPost--1pOcN .style-module--heroSection--eUZVN{background-color:#e6f5fb}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12{text-align:left;padding-top:0;max-width:780px;margin:0 auto}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .cflt-pp img{border-radius:50%;margin:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:start;align-items:flex-start;text-transform:uppercase;margin:30px 0;-ms-flex-wrap:wrap;flex-wrap:wrap;border-bottom:2px solid rgba(130,148,148,.25)}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT{display:-ms-flexbox;display:flex;-ms-flex:1 1;flex:1 1;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT{-ms-flex-direction:column;flex-direction:column}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-right:20px;margin-bottom:20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio a{color:#000;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;line-height:1}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp{margin-right:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp img{height:45px;width:45px}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp img{height:25px;width:25px}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi{display:none}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi svg{margin-left:35px;height:30px;width:30px;cursor:pointer}@media print{.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi svg{display:none}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--date--24xyw{color:#829494;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;display:block;margin-bottom:10px;text-transform:uppercase}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje{position:relative;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12

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.style-module--content--3iWje pre{padding:30px 10px 20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje a{color:#257bd7}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje sup{top:-2px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img{max-width:100%;margin:10px auto;display:block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img.alignleft{float:left;margin-right:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img.alignright{float:right;margin-left:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2{font-size:21px}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3{color:#000;font-size:21px;font-weight:500;line-height:27px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h4.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h5.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h6.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm{display:none;font-size:14px;margin-left:5px;vertical-align:middle;text-decoration:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h4.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h5.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h6.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm{display:inline-block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje iframe{max-width:100%}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje p{margin-bottom:20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ol li,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ol span:not(.embed-gist),.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>p,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ul li,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ul span:not(.embed-gist){color:#000!important;font-size:16px;font-weight:300}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote h4{line-height:inherit;font-size:16px;font-weight:400}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote br{display:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote em{font-size:20px;display:block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote span{display:block;margin-top:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8{position:absolute;right:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8 i{cursor:pointer;position:relative;top:5px;right:8px;z-index:10;font-size:16px;opacity:.7}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8 i:hover{opacity:1}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje li .style-module--copy--YJWu8 i{top:30px}.style-

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module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje li p+.style-module--
copy--YJWu8 i{top:5px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--
content--3iWje .style-module--tableWrapper--3giJw{width:100%}@media screen and (max-width:767px){.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--
tableWrapper--3giJw{overflow:scroll}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-
module--content--3iWje .download_blue.rounded_button,.style-module--blogPost--1pOcN .style-module--
mainSection--3uX12 .style-module--content--3iWje .orange_button{transition:all .5s ease-in-out;transition:all .5s
cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;font-weight:700;letter-
spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-
transform:uppercase;background-color:transparent;border:1px solid
#173361;color:#173361;color:#173361!important}.style-module--blogPost--1pOcN .style-module--mainSection--
3uX12 .style-module--content--3iWje .download_blue.rounded_button:hover,.style-module--blogPost--1pOcN
.style-module--mainSection--3uX12 .style-module--content--3iWje .orange_button:hover{cursor:pointer;text-
decoration:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--
3iWje .image-caption{display:block;font-size:14px;font-style:italic;font-weight:400;text-align:center}.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio{border-
top:2px solid hsla(0,0%,96.1%,.85);border-bottom:2px solid hsla(0,0%,96.1%,.85);margin-top:100px;padding:20px
0;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}@media screen and (max-
width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje
.cflt-bio{-ms-flex-direction:column;flex-direction:column}}.style-module--blogPost--1pOcN .style-module--
mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-blurb{font-size:14px;font-weight:300;margin-
bottom:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-
bio .cflt-blurb>*.style-module--blogPost--1pOcN .style-module--mainSection--
3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp{margin-right:30px}@media print{.style-module--blogPost--
1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp{display:none}}@media
screen and (max-width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module-
-content--3iWje .cflt-bio .cflt-pp{margin-right:0;margin-bottom:30px}}.style-module--blogPost--1pOcN .style-
module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-
pp>div{width:70px!important;height:70px!important}.style-module--blogPost--1pOcN .style-module--mainSection-
-3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp img{height:70px;width:70px}.style-module--blogPost--
1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio.cflt-default .cflt-
blurb{color:#173361!important;font-size:20px;font-weight:700}@media screen and (max-width:767px){.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 code{word-break:break-word}}.style-module--
contentSection--2SdyY{padding-top:40px;padding-bottom:40px}.style-module--contentSection--2SdyY .style-
module--nav--3Yw6O li{font-weight:700;letter-spacing:1.2px;font-size:14px;display:inline-block;text-
transform:uppercase}@media screen and (max-width:575px){.style-module--contentSection--2SdyY .style-module-
-nav--3Yw6O li{display:block}}.style-module--contentSection--2SdyY .style-module--nav--3Yw6O
li+li:before{content:" | ";margin:0 15px}@media screen and (max-width:575px){.style-module--contentSection--
2SdyY .style-module--nav--3Yw6O li+li:before{display:none}}.style-module--contentSection--2SdyY .style-
module--nav--3Yw6O li.style-module--active--3XD4X a{color:#000}.style-module--contentSection--2SdyY .style-
module--item--2pvTa{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;border-bottom:1px
solid #efefef;padding:40px 0}.style-module--contentSection--2SdyY .style-module--item--2pvTa:last-child{border-
bottom:none}.style-module--contentSection--2SdyY .style-module--imageContainer--jy83c{margin-
right:20px}.style-module--contentSection--2SdyY .style-module--imageContainer--jy83c img{max-
width:none;width:110px}@media screen and (max-width:575px){.style-module--contentSection--2SdyY .style-
module--imageContainer--jy83c{display:none}}.style-module--contentSection--2SdyY .style-module--content--
32ux0{text-align:left}.style-module--contentSection--2SdyY .style-module--content--32ux0 .style-module--date--
woPnD{color:#000;font-size:18px;font-weight:700;line-height:23px;font-weight:400}.style-module--

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contentSection--2SdyY .style-module--content--32ux0 .style-module--title--F4YNt{color:#173361;font-size:21px;font-weight:500;line-height:27px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 {padding-top:40px;padding-bottom:40px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li {font-weight:700;letter-spacing:1.2px;font-size:14px;display:inline-block;text-transform:uppercase} @media screen and (max-width:575px) { .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li {display:block} } .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li+li:before {content:" | ";margin:0 15px} @media screen and (max-width:575px) { .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li+li:before {display:none} } .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li .style-module--active---WwI6 a {color:#000} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--item--1kvxe {display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;border-bottom:1px solid #efefef;padding:40px 0} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--item--1kvxe:last-child {border-bottom:none} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC {margin-right:20px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC img {max-width:none;width:110px} @media screen and (max-width:575px) { .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC {display:none} } .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq {text-align:left} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq .style-module--date--2FYZI {color:#000;font-size:18px;font-weight:700;line-height:23px;font-weight:400} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq .style-module--title--1yiWy {color:#173361;font-size:21px;font-weight:500;line-height:27px} .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 {color:#000;font-size:18px;font-weight:300;line-height:1.39;text-align:left} @media screen and (max-width:767px) { .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 {margin-top:20px} } .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 h2 {margin-bottom:40px} .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 .style-module--section--LDg5t {margin:20px 0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--card--_rdUr, .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr {padding:25px;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--card--_rdUr h3, .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr h3 {color:#173361;font-size:18px;font-weight:700;line-height:23px;margin-bottom:25px;padding-bottom:0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl h1 {margin-bottom:50px} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q {width:100%} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr {background:#c4eff2} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr: hover {border-color:#0074a2} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr img {max-height:160px;width:auto} .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL {padding-top:20px} @media screen and (max-width:767px) { .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL {padding-top:0} } .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr {background:hsla(0,0%,96.1%,.85)} .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr .style-module--cardContent--3dK28 {overflow:hidden;text-overflow:ellipsis;display:-webkit-box;-webkit-line-clamp:4;-webkit-box-orient:vertical} .style-module--pageResourceList--2xJSM .style-module--header--32Kgf {display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;margin-bottom:50px} @media screen and (max-width:767px) { .style-module--pageResourceList--2xJSM .style-module--header--32Kgf {-ms-flex-direction:column-reverse;flex-direction:column-reverse} } .style-module--pageResourceList--2xJSM .style-module--

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header--32Kgf form{display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-start;-ms-flex-wrap:wrap;flex-wrap:wrap;width:100%;max-width:calc(100% - 140px)}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form{-ms-flex-direction:column;flex-direction:column;max-width:none;padding-top:10px;border-top:2px solid hsla(0,0%,96.1%,.85)}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{margin-right:10px;width:calc((100% - 40px)/5)}@media screen and (min-width:768px) and (max-width:991px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{margin-bottom:10px;width:calc((100% - 30px)/3)}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{width:100%;margin-bottom:10px;margin-right:0}}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS:last-child{margin-right:0}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS:last-child{margin-bottom:0}}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf button{-ms-flex-item-align:start;align-self:flex-start}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf button{width:100%;margin-bottom:10px}}@media screen and (max-width:767px){.style-module--coverModule--1neFV{text-align:center}}.style-module--coverModule--1neFV img{max-height:250px;height:auto}.style-module--contentModule--2GbeI.style-module--fullWidth--3WdfM{max-width:none!important}.style-module--contentModule--2GbeI ol li,.style-module--contentModule--2GbeI ol span,.style-module--contentModule--2GbeI p,.style-module--contentModule--2GbeI ul li,.style-module--contentModule--2GbeI ul span{color:#000;font-size:14px;font-weight:300;line-height:25px}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ .col-sm-6{width:49%}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx [id^=vidyard_] {max-width:599px!important;width:100%!important}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx:not(.style-module--slide--2TjeV) .row .col-sm-6{width:100%}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row .col-sm-6{width:100%;text-align:center}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row .col-sm-6+.col-sm-6{margin-top:20px}}.style-module--contentModule--2GbeI .style-module--recordingTime--1eBRY p{font-size:18px;font-weight:700}.style-module--contentModule--2GbeI h2{color:#000;font-size:28px}.style-module--contentModule--2GbeI .style-module--content--1Smjq img{width:100%;max-width:100px;border-radius:50%;margin-right:20px}.style-module--contentModule--2GbeI .style-module--content--1Smjq .style-module--speakerContainer--1AYAJ .style-module--speaker--r_Ydq{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}.style-module--contentModule--2GbeI .style-module--content--1Smjq .style-module--speakerContainer--1AYAJ .style-module--speaker--r_Ydq img{max-width:100px;width:auto}.style-module--formModule--2QTWW{max-width:480px;width:100%}@media screen and (min-width:768px){.style-module--formModule--2QTWW{position:absolute;right:0;top:0}}.style-module--formModule--2QTWW .style-module--formContainer--2LkcV{background:hsla(0,0%,96.1%,.85);border-radius:8px;padding:25px;position:relative}.style-module--formModule--2QTWW .style-module--formContainer--2LkcV h3{color:#173361;font-size:18px;font-weight:700;text-align:center;margin-bottom:20px}.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;width:100%!important}.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba input,.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba select{background-color:#fff!important;border:2px solid hsla(0,0%,73.3%,.5)!important;border-radius:4px;width:100%!important;margin-bottom:5px;color:#000;font-size:14px;line-height:1.2!important;padding:10px!important}.style-module--formModule--2QTWW .style-module--

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formContainer--2LkcV form.style-module--form--1G1ba input::-webkit-input-placeholder,.style-module--
formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba select::-webkit-
input-placeholder{ color:#829494 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
form.style-module--form--1G1ba input::-moz-placeholder,.style-module--formModule--2QTWW .style-module--
formContainer--2LkcV form.style-module--form--1G1ba select::-moz-placeholder{ color:#829494 }.style-module--
formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba input:-ms-input-
placeholder,.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--
form--1G1ba select:-ms-input-placeholder{ color:#829494 }.style-module--formModule--2QTWW .style-module--
formContainer--2LkcV form.style-module--form--1G1ba input::placeholder,.style-module--formModule--2QTWW
.style-module--formContainer--2LkcV form.style-module--form--1G1ba select::placeholder{ color:#829494 }.style-
module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba
select{ cursor:pointer;color:#829494 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
form.style-module--form--1G1ba .mktoButtonRow{ text-align:center;margin-top:25px;-ms-flex-
order:15;order:15 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-
module--form--1G1ba .mktoButtonRow button{ transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(.785,.135,.15,.86);border-radius:6px;border-style:solid;border-width:1px;display:inline-block;font-
size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-
decoration:none;text-transform:uppercase;background-color:#173361 !important;border-
color:#173361 !important;color:#fff !important;width:auto !important;font-size:12px !important;font-
weight:400 !important }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-
module--form--1G1ba .mktoButtonRow button:hover{ cursor:pointer;text-decoration:none;border:1px solid
#173361 !important }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
.mktoRequiredField label.mktoHasWidth{ color:#173361;width:auto !important }.style-module--
thankyouCtaModule--3D9ye{ margin-bottom:100px }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx{ display:-ms-flexbox;display:flex } @media screen and (max-width:991px){ .style-module-
-thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx { -ms-flex-direction:column;flex-
direction:column } }.style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-
module--card--2kGFK{ -ms-flex:1 1;flex:1 1;margin-right:10px;position:relative } @media screen and (max-
width:991px){ .style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--
card--2kGFK{ margin-right:0;margin-bottom:50px } }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK:last-child{ margin-right:0 } @media screen and (max-
width:991px){ .style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--
card--2kGFK:last-child{ margin-bottom:0 } }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK>div{ text-align:center }.style-module--thankyouCtaModule--
3D9ye .style-module--contentContainer--N9Zhx .style-module--card--2kGFK>div a{ margin-top:20px }.style-
module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--card--2kGFK
h3{ color:#173361;font-size:12px;font-weight:500;letter-spacing:1.2px;text-transform:uppercase;margin:20px 0
30px }.style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--card--
2kGFK .style-module--icon--2vg1C{ position:absolute;top:0;left:50%;-ms-transform:translate(-50%,-
50%);transform:translate(-50%,-50%) }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK .style-module--icon--2vg1C
svg{ height:60px;width:auto }.style-module--page--2eWr8 .style-module--heroSection--2gXmv{ margin-
bottom:25px }.style-module--page--2eWr8 .style-module--heroSection--2gXmv>div{ -ms-flex-pack:start;justify-
content:flex-start;text-align:left }.style-module--page--2eWr8 .style-module--pageContent--21Evr{ margin-
bottom:100px }.style-module--page--2eWr8 .style-module--pageContent--21Evr>section{ padding-top:0;padding-
bottom:0;min-height:640px }.style-module--page--2eWr8 .style-module--pageContent--21Evr p{ margin:15px
0 }.style-module--page--2eWr8 .style-module--content--3ZqVM{ display:-ms-flexbox;display:flex;-ms-flex-
direction:column;flex-direction:column;text-align:left;position:relative }.style-module--page--2eWr8 .style-module--

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content--3ZqvM .style-module--columns--rMAvt{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt{-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div{-ms-flex:1 1;flex:1 1}@media screen and (min-width:768px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div:first-child{min-width:360px;width:100%;max-width:600px}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos{max-width:480px;width:100%;position:relative}@media screen and (min-width:768px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos{margin-left:40px}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos.style-module--noPointer--aUuu8{pointer-events:none}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow:first-of-type{-ms-flex-order:14;order:14}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText{margin-top:15px;width:100% !important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span{color:#829494 !important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span span,.style-module--page--

2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span span{text-decoration:none!important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span a{color:#257bd7!important}.style-module--thankyouPage--q8Sx\_ iframe{max-width:100%}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv>div{padding:70px}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM{width:90%}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .style-module--button--xWcox{margin-top:50px}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .orange\_button{transition:all .5s ease-in-out;transition:all .5s cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-transform:uppercase;background-color:#fff;border:1px solid #fff;color:#173361;display:block;width:260px;margin:50px auto 0}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .orange\_button:hover{cursor:pointer;text-decoration:none}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur[id^=vidyard\_]{max-width:599px!important;width:100%!important}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--caption--3c1g\_ .style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur p{font-size:14px}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur:not(.style-module--slide--NvD8Q) .row .col-sm-6{width:100%}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row .col-sm-6{width:100%;text-align:center}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row .col-sm-6+.col-sm-6{margin-top:20px}}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--

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thankyouMessage--1L9PD{margin-top:40px}@media screen and (max-width:767px){.style-module--testimonials--
2eY00 .style-module--header--C0_Br{margin:20px 0}}.style-module--testimonials--2eY00 .style-module--pager--
1Lh_S{margin-top:0;margin-bottom:0;padding:0;list-style:none;display:-ms-
flexbox!important;display:flex!important;overflow-x:scroll}@media screen and (min-width:992px){.style-module--
testimonials--2eY00 .style-module--pager--1Lh_S{-ms-flex-pack:center;justify-content:center;margin-
left:auto;margin-right:auto;overflow-x:hidden}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
li{display:-ms-flexbox;display:flex;-ms-flex-align:end;align-items:flex-end;margin-left:20px;margin-
right:20px}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S li:first-child{margin-left:0}.style-
module--testimonials--2eY00 .style-module--pager--1Lh_S li:last-child{margin-right:0}.style-module--testimonials-
2eY00 .style-module--pager--1Lh_S div{padding:20px;position:relative;border-bottom:2px solid
#fff;cursor:pointer}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S span{display:inline-
block}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_demonware--2NWgW
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/c007816e3c3e863cc1ba2e56c5ff
cdb24675cea7/demonware-inactive@1x.png") no-repeat;background-size:177px
52px;width:177px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/dfccd6b0f1f5dfa154397dc93c713adeb407b7
7c/demonware-inactive@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-
module--logo_demonware--2NWgW:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid
transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover:after{border-bottom-color:#2bc7f6}.style-module--testimonials--2eY00 .style-
module--pager--1Lh_S .style-module--logo_demonware--2NWgW:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/3ede249ffc57be8a8c1ebf27df25d3f79819f
71/demonware-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/137fe5177082deef18bd8d1ca809c3ba4c98e
a09/demonware-active@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active
.style-module--logo_demonware--2NWgW,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-
active .style-module--logo_demonware--2NWgW:after{border-bottom-color:#2bc7f6}.style-module--testimonials--
2eY00 .style-module--pager--1Lh_S .slick-active .style-module--logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/3ede249ffc57be8a8c1ebf27df25d3f79819f
71/demonware-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/137fe5177082deef18bd8d1ca809c3ba4c98e
a09/demonware-active@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_uronext--3Amyq
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/0e71eaf193cff199816be9f59b67
add6e04b3d16/uronext-inactive@1x.png") no-repeat;background-size:155px
52px;width:155px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_uronext--3Amyq span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/102e3d9fe091abc385c4c1a52a090c39763a0
010/uronext-inactive@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--

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844/audi-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP

span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7ad37ca2b928e30340dd1915e506ed4c87d1b80b/tivo-inactive@1x.png") no-repeat;background-size:94px 52px;width:94px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f8f80f57af322ca3011028ff76a8a88697103fe0/tivo-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:hover:after{border-bottom-color:#0398cc}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b72ed025599af4bef5003d7b7c4624db94fdf6d4/tivo-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/fe5b8286b9637b2a6ce3c5e65f9185aa145db9c3/tivo-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP:after{border-bottom-color:#0398cc}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b72ed025599af4bef5003d7b7c4624db94fdf6d4/tivo-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/fe5b8286b9637b2a6ce3c5e65f9185aa145db9c3/tivo-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK

span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7c00f1dcadcea2cc04db4e5da9d3f63f88fed239/recursion-inactive@1x.png") no-repeat;background-size:148px 59px;width:148px;height:59px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/326e1553106d5ccf0a708363688645e0fa163cb2/recursion-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:hover:after{border-bottom-color:#9e4e9b}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/614ce0dc7760e2497100a0011d80a7777438604b/recursion-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/8451aabc5bacc0d92dc5ddc9f77f114d8af38c



logo\_bosch--1am6O: hover, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_bosch--1am6O: hover: after { border-bottom-color: #ea0215 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .style-module--logo\_bosch--1am6O: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/530eb0282bb3d318576eb05cb58ef0afb3e33e3/bosch-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_bosch--  
1am6O: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6505032981159f7aaacf97ff8cb80f2d2576ab  
b5/bosch-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_bosch--1am6O, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_bosch--1am6O: after { border-bottom-color: #ea0215 } .style-module--testimonials--2eY00 .style-  
module--pager--1Lh\_S .slick-active .style-module--logo\_bosch--1am6O span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/530eb0282bb3d318576eb05cb58ef0afb3e33e3/bosch-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--  
logo\_bosch--1am6O span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6505032981159f7aaacf97ff8cb80f2d2576ab  
b5/bosch-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE  
span { background: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/00596b513d0ed47a67b69b966f9  
ea42e6a8474b2/nuuly-inactive@1x.png") no-repeat; background-size: 104px  
59px; width: 104px; height: 59px } @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and  
(min-resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/65f0a6c5b63c689da45792e095deb364aa7be  
ef8/nuuly-inactive@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: after { width: 0; height: 0; border-left: 5px solid transparent; border-right: 5px solid  
transparent; border-bottom: 5px solid #fff; content: ""; position: absolute; left: 50%; bottom: 0; -ms-transform: translateX(-  
50%); transform: translateX(-50%)} .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: hover, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: hover: after { border-bottom-color: #000 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .style-module--logo\_nuuly--9d-UE: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f0e1ff6ba8439f6e254a46b2495e03288d8e7  
873/nuuly-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_nuuly--  
9d-UE: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/cdaa71ec4ef4c1fdaeb06c54ab580e9b437e87  
64/nuuly-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_nuuly--9d-UE, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_nuuly--9d-UE: after { border-bottom-color: #000 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .slick-active .style-module--logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f0e1ff6ba8439f6e254a46b2495e03288d8e7  
873/nuuly-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--  
logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/cdaa71ec4ef4c1fdaeb06c54ab580e9b437e87  
64/nuuly-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_forbes--3sEAE





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logo_googlecloud--2trjN:hover:after{border-bottom-color:#2b84e7}.style-module--testimonials--2eY00 .style-
module--pager--1Lh_S .style-module--logo_googlecloud--2trjN:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_googlecloud--2trjN:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_googlecloud--2trjN,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active
.style-module--logo_googlecloud--2trjN:after{border-bottom-color:#2b84e7}.style-module--testimonials--2eY00
.style-module--pager--1Lh_S .slick-active .style-module--logo_googlecloud--2trjN span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-module--
logo_googlecloud--2trjN span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
.container{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-
align:end;align-items:flex-end;min-width:760px}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
.container>div{padding:20px;position:relative;border-bottom:2px solid #fff;cursor:pointer}.style-module--
testimonials--2eY00 .slick-list{padding:40px 0}.style-module--testimonials--2eY00 .slick-list .slick-track{display:-
ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}.style-module--testimonials--2eY00 .style-module-
-testimonial--qVXIA{text-align:center}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
header{font-size:12px;font-weight:300;letter-spacing:2px;line-height:2.67;text-transform:uppercase}.style-module--
testimonials--2eY00 .style-module--testimonial--qVXIA header .style-module--name--1KjXx{color:#173361;font-
size:12px;font-weight:500;line-height:2.67;letter-spacing:2px}.style-module--testimonials--2eY00 .style-module--
testimonial--qVXIA blockquote{border:0;color:#38cccd;font-size:30px;font-weight:700;font-style:italic;line-
height:1.25;margin:20px auto;max-width:780px;padding:0}.style-module--testimonials--2eY00 .style-module--
testimonial--qVXIA blockquote:after,.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
blockquote:before{content:""}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA blockquote
a{color:inherit}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA .style-module--
ctaContainer--305F4{position:relative}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
.style-module--ctaContainer--305F4:after{content:"\203A";color:#0074a2;position:absolute;top:-7px;line-
height:1;font-size:30px;right:-15px}@media screen and (max-width:767px){.style-module--testimonials--2eY00
.style-module--testimonial--qVXIA .style-module--ctaContainer--305F4:after{display:none}}.style-module--
testimonials--2eY00 .style-module--testimonial--qVXIA .style-module--ctaContainer--305F4 a{color:#0074a2;text-
decoration:underline}.style-module--card--1fsSo{transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(1,0,0,1);border-radius:8px;background-color:#fff;padding:30px 30px 0;margin:0 auto 40px}.style-module--
card--1fsSo .slick-list{padding:20px 0 0}.style-module--card--34klN{transition:all .5s ease-in-out;transition:all .5s
cubic-bezier(1,0,0,1);border-radius:8px;background-color:#fff;padding:30px}.style-module--card--34klN.style-
module--clickable--2Yaw8{cursor:pointer;border:2px solid transparent}.style-module--card--34klN.style-module--
clickable--2Yaw8:hover{border-color:#173361;-ms-transform:scale(1.05);transform:scale(1.05)}.style-module--
card--34klN .style-module--label--1lqnK{margin-bottom:13px;text-transform:uppercase}.style-module--card--
34klN .style-module--label--1lqnK h4{background:#0074a2;border-radius:4px;color:#fff;display:inline-block;font-
size:12px;font-weight:500;letter-spacing:1.2px;margin:0;padding:5px 10px}.style-module--card--34klN .style-
module--label--1lqnK.style-module--denim--urWOq h4{background:#173361}.style-module--card--34klN .style-
module--label--1lqnK.style-module--academy--88tr5 h4{background:#0074a2}.style-module--card--34klN .style-
module--label--1lqnK.style-module--island--3Prwv h4{background:#38cccd}.style-module--card--34klN .style-

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module--label--1lqnK.style-module--robinSEggBlue--1da6r h4{background:#b4e1e4}.style-module--card--34klN  
 .style-module--label--1lqnK.style-module--sahara--iUZFc h4{background:#c5832e}.style-module--card--34klN  
 .style-module--label--1lqnK.style-module--canary--28W1H h4{background:#ffc40c}.style-module--card--34klN  
 .style-module--wrapper--1at\_H{color:inherit;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-  
 align:left;margin:0;display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-  
 direction:column;height:100%}.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--  
 image\_left--19IAJ,.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--image\_right--  
 3CHGD{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.style-module--card--34klN  
 .style-module--wrapper--1at\_H.style-module--image\_left--19IAJ,.style-module--card--34klN .style-module--  
 wrapper--1at\_H.style-module--image\_right--3CHGD{display:block}}.style-module--card--34klN .style-module--  
 wrapper--1at\_H.style-module--image\_left--19IAJ .style-module--imageWrapper--1FRHo,.style-module--card--  
 34klN .style-module--wrapper--1at\_H.style-module--image\_right--3CHGD .style-module--imageWrapper--1FRHo{-  
 ms-flex:2 1;flex:2 1;max-width:160px}@media screen and (max-width:767px){.style-module--card--34klN .style-  
 module--wrapper--1at\_H.style-module--image\_left--19IAJ .style-module--imageWrapper--1FRHo,.style-module--  
 card--34klN .style-module--wrapper--1at\_H.style-module--image\_right--3CHGD .style-module--imageWrapper--  
 1FRHo{text-align:left;margin-bottom:15px}}.style-module--card--34klN .style-module--wrapper--1at\_H.style-  
 module--image\_left--19IAJ .style-module--imageWrapper--1FRHo img,.style-module--card--34klN .style-module--  
 wrapper--1at\_H.style-module--image\_right--3CHGD .style-module--imageWrapper--1FRHo img{max-  
 width:200px}.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--image\_left--19IAJ .style-  
 module--copy--3YFnP,.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--image\_right--  
 3CHGD .style-module--copy--3YFnP{-ms-flex:4 1;flex:4 1}.style-module--card--34klN .style-module--wrapper--  
 1at\_H.style-module--image\_left--19IAJ{-ms-flex-direction:row;flex-direction:row}.style-module--card--34klN  
 .style-module--wrapper--1at\_H.style-module--image\_left--19IAJ .style-module--imageWrapper--1FRHo{margin-  
 right:25px}.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--image\_right--3CHGD{-ms-  
 flex-direction:row-reverse;flex-direction:row-reverse}.style-module--card--34klN .style-module--wrapper--  
 1at\_H.style-module--image\_right--3CHGD .style-module--imageWrapper--1FRHo{margin-left:25px;text-  
 align:right}.style-module--card--34klN .style-module--wrapper--1at\_H.style-module--image\_top--39SWu .style-  
 module--imageWrapper--1FRHo{margin-bottom:15px;text-align:center}.style-module--card--34klN .style-module--  
 wrapper--1at\_H.style-module--image\_top--39SWu .style-module--copy--3YFnP{-ms-flex:1 1;flex:1 1;display:-ms-  
 flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--card--34klN .style-module--  
 wrapper--1at\_H .style-module--imageWrapper--1FRHo img{width:100%}.style-module--card--34klN .style-  
 module--wrapper--1at\_H .style-module--copy--3YFnP h3{color:#000;font-size:18px;font-weight:700;line-  
 height:1.5;margin:0;padding:0 0 10px;overflow:hidden;text-overflow:ellipsis}.style-module--card--34klN .style-  
 module--wrapper--1at\_H .style-module--copy--3YFnP h3 a{color:inherit;pointer-events:none;text-  
 decoration:none}.style-module--card--34klN .style-module--wrapper--1at\_H .style-module--copy--3YFnP  
 p{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;max-width:450px;margin:0  
 auto}.style-module--card--34klN .style-module--wrapper--1at\_H .style-module--copy--3YFnP .style-module--meta-  
 -2DoOH{color:#0074a2;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;display:block;line-  
 height:normal;text-transform:uppercase;margin-bottom:10px}.style-module--card--34klN .style-module--wrapper--  
 1at\_H .style-module--copy--3YFnP .style-module--contentContainer--WACfF{margin-bottom:20px}.style-module--  
 -card--34klN .style-module--wrapper--1at\_H .style-module--copy--3YFnP .style-module--contentContainer--  
 WACfF p{margin-left:0;margin-right:0}.style-module--card--34klN .style-module--wrapper--1at\_H .style-module--  
 copy--3YFnP .style-module--contentContainer--WACfF.style-module--noCta--\_nvte{margin-bottom:0}.style-  
 module--card--34klN .style-module--wrapper--1at\_H .style-module--copy--3YFnP .style-module--buttonContainer--  
 GiF5v{margin:auto 0 0}.style-module--card--34klN .style-module--wrapper--1at\_H .style-module--copy--3YFnP  
 .style-module--buttonContainer--GiF5v a{display:inline-block}.style-module--denim--urWOq.style-module--active-  
 -2sKU1{border:2px solid #173361;background-color:rgba(23,51,97,.05)}.style-module--denim--urWOq .style-  
 module--label--1lqnK h4{background:none;color:#173361}.style-module--denim--urWOq .style-module--wrapper--

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1at_H .style-module--copy--3YFnP h3{color:#173361}.style-module--purple--nb0ge.style-module--active--
2sKU1{border:2px solid #551d9d;background-color:rgba(85,29,157,.05)}.style-module--purple--nb0ge .style-
module--label--1lqnK h4{background:none;color:#551d9d}.style-module--purple--nb0ge .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#551d9d}.style-module--green--3SxHv.style-module--active--
2sKU1{border:2px solid #159e86;background-color:rgba(21,158,134,.05)}.style-module--green--3SxHv .style-
module--label--1lqnK h4{background:none;color:#159e86}.style-module--green--3SxHv .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#159e86}.style-module--blue--1XZoW.style-module--active--
2sKU1{border:2px solid #0daccc;background-color:rgba(13,172,204,.05)}.style-module--blue--1XZoW .style-
module--label--1lqnK h4{background:none;color:#0daccc}.style-module--blue--1XZoW .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#0daccc}.style-module--orange--1rWcw.style-module--active--
2sKU1{border:2px solid #e37d62;background-color:rgba(227,125,98,.05)}.style-module--orange--1rWcw .style-
module--label--1lqnK h4{background:none;color:#e37d62}.style-module--orange--1rWcw .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#e37d62}.style-module--grey--3LMDj.style-module--active--
2sKU1{border:2px solid #58788c;background-color:rgba(88,120,140,.05)}.style-module--grey--3LMDj .style-
module--label--1lqnK h4{background:none;color:#58788c}.style-module--grey--3LMDj .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#58788c}.index-module--pageCommunity--2w1tS h2{font-
size:26px;font-weight:400}.index-module--pageCommunity--2w1tS h3{font-size:18px!important;line-
height:1.2!important}.index-module--pageCommunity--2w1tS ul{list-style:none;margin:0;padding:0}.index-
module--pageCommunity--2w1tS .index-module--button--2A-hL{border-radius:4px;border:1px solid #2a2a2d;text-
transform:uppercase;font-size:12px;color:#2a2a2d;letter-spacing:.75px;font-weight:700;text-
decoration:none;padding:10px 40px}.index-module--pageCommunity--2w1tS .index-module--bgGrey--
Sx7Vk{background-color:#f0f0f2}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu
section>div{margin-bottom:0}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu section
p{max-width:590px;margin:15px auto}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu
.index-module--supportingLinks--1jeNd{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;margin:50px auto 0}@media screen and (max-width:767px){.index-module--pageCommunity--
2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd{margin-top:25px}}@media screen and
(max-width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--
supportingLinks--1jeNd{-ms-flex-direction:column;flex-direction:column}}.index-module--pageCommunity--
2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd>*{margin-right:15px}.index-module--
pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd>:last-child{margin-
right:0}@media screen and (max-width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--
2uRdu .index-module--supportingLinks--1jeNd>:last-child{margin-bottom:0}}@media screen and (max-
width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--
supportingLinks--1jeNd>*{margin-right:0;margin-bottom:15px}}.index-module--pageCommunity--2w1tS .index-
module--content--10g54>section{padding:60px 0;position:relative;text-align:center}.index-module--
pageCommunity--2w1tS .index-module--content--10g54>section:first-child{padding:160px 0 120px}.index-
module--pageCommunity--2w1tS .index-module--content--10g54>section .index-module--paragraph--3g3tT{max-
width:800px;margin:0 auto}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-
module--mapContainer--1bbeS .index-module--map--24bh5{width:100%;height:650px}.index-module--
pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ-{margin-
top:40px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--
1rXZ->ul{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-
wrap:wrap;flex-wrap:wrap}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module-
-countryList--1rXZ->ul li{border:1px solid #f2f3f4;min-width:220px;text-align:left}.index-module--
pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a{padding:13px
10px;display:block;text-decoration:none}.index-module--pageCommunity--2w1tS .index-module--content--10g54
.index-module--countryList--1rXZ->ul li a span:first-child{display:inline-block;font:normal normal normal 14px/1

```

FontAwesome;text-rendering:auto;-webkit-font-smoothing:antialiased;-moz-osx-font-smoothing:grayscale;font-size:16px;color:#fff;background-color:#173361;padding:14px;margin-right:16px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a span:first-child:before{content:"\F067"}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a span:last-child{color:#000;font-size:16px;font-weight:700}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li.index-module--current--2byzP{background-color:#f2f3f4}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li.index-module--current--2byzP a span:first-child:before{content:"\F068"}@media screen and (max-width:1199px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:center;justify-content:center}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{min-width:220px;margin-top:10px;margin-right:20px}}@media screen and (max-width:991px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:justify;justify-content:space-between}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{width:48%;margin-top:10px;margin-right:0}}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:center;justify-content:center}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{width:100%;margin-top:10px}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK{background-color:#f2f3f4;clear:both;display:none;text-align:left}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul{clear:both;padding:20px 0 40px;overflow:hidden}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li{display:inline-block;width:16%;min-width:180px;padding:15px 20px;float:left}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li span{display:block;color:#000}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li a span{color:#4597cb}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK.index-module--current--2byzP{display:block}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul{display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;margin:40px auto;max-width:800px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul li{max-width:180px}@media screen and (max-width:991px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul{-ms-flex-wrap:wrap;flex-wrap:wrap}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul li{width:45%;margin-top:10px;max-width:none}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--getInvolvedText--3IUwT{font-size:14px;margin:40px auto 20px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU{padding-bottom:0}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardContainer--1WjI3{display:-ms-flexbox;display:flex;-ms-flex-direction:row;flex-direction:row;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardContainer--1WjI3{-ms-flex-direction:column;flex-direction:column}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--card--3JCqV{margin:0;width:32.5%;background:hsla(0,0%,96.1%,.85)}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU

.index-module--card--3JCqV{width:100%;margin-top:1rem}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardImage--X4ASv{display:-ms-flexbox;display:flex;width:100%;height:15rem}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardImage--X4ASv

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.style-module--copyParagraph--2sb3Z{margin-bottom:0} .style-module--copyContainer--3eWSz .style-module--
listButton--3BcwF{min-width:175px;text-align:center}@media screen and (max-width:991px){.style-module--
copyContainer--3eWSz .style-module--listButton--3BcwF{display:none} .style-module--listContainer--2NB6w
.style-module--unorderedList--Mod8X{padding-left:20px;margin:20px 0 0 40px}@media screen and (max-
width:991px){.style-module--listContainer--2NB6w .style-module--unorderedList--Mod8X{margin-left:0} .style-
module--listContainer--2NB6w .style-module--unorderedListItem--1wqXF{text-align:left} .style-module--
listContainer--2NB6w .style-module--noLink--3t5n5,.style-module--listContainer--2NB6w .style-module--
unorderedListLink--3IE4p{font-size:14px;font-weight:300;line-height:1.79;margin-left:10px} .style-module--
listContainer--2NB6w .style-module--noLink--3t5n5{color:rgba(0,0,0,.85)}.government-module--page--3ihGK
.government-module--hero--2BDaj .government-module--heroContent--M1-ls{max-
width:580px;width:100%}.government-module--page--3ihGK .government-module--hero--2BDaj .government-
module--heroContent--M1-ls>a{max-width:245px}@media screen and (max-width:767px){.government-module--
page--3ihGK .government-module--hero--2BDaj .government-module--heroContent--M1-
ls>a{display:block;margin:20px auto}}@media screen and (min-width:768px){.government-module--page--3ihGK
.government-module--missionSection--1n5_j p,.government-module--page--3ihGK .government-module--
operations--264Pz p{max-width:640px;width:100%;margin:auto} .government-module--page--3ihGK
.government-module--missionSection--1n5_j p,.government-module--page--3ihGK .government-module--
operationsCopy--2Qahm{font-size:14px;font-weight:300;line-height:1.79;text-
align:center;color:rgba(0,0,0,.85);margin-bottom:30px} .government-module--page--3ihGK .government-module--
federalDataStrategy--1Q3ge{display:block} .government-module--page--3ihGK .government-module--
federalDataStrategy--1Q3ge .government-module--content--33zR-{display:-ms-flexbox;display:flex;-ms-flex-
pack:justify;justify-content:space-between}@media screen and (max-width:767px){.government-module--page--
3ihGK .government-module--federalDataStrategy--1Q3ge .government-module--content--33zR-{-ms-flex-
direction:column;flex-direction:column}} .government-module--page--3ihGK .government-module--
federalDataStrategy--1Q3ge .government-module--card--1MI5R{max-width:49.5%;width:auto}@media screen and
(max-width:767px){.government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge
.government-module--card--1MI5R{max-width:none;margin-right:0;margin-bottom:20px}} .government-module--
page--3ihGK .government-module--resourcesSection--IhntF{display:block} .government-module--page--3ihGK
.government-module--resourcesSection--IhntF .government-module--content--33zR-{display:-ms-
flexbox;display:flex}@media screen and (max-width:767px){.government-module--page--3ihGK .government-
module--resourcesSection--IhntF .government-module--content--33zR-{-ms-flex-direction:column;flex-
direction:column}} .government-module--page--3ihGK .government-module--resourcesSection--IhntF .government-
module--content--33zR->div{-ms-flex:2 1;flex:2 1} .government-module--page--3ihGK .government-module--
resourcesSection--IhntF .government-module--content--33zR- .government-module--card--
1MI5R{background:hsla(0,0%,96.1%,.85)}.government-module--page--3ihGK .government-module--
missionSection--1n5_j .government-module--logoContainer--3EBWR{list-style:none;padding:0;display:-ms-
flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;max-width:992px;margin:40px auto
0}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--
missionSection--1n5_j .government-module--logoContainer--3EBWR{-ms-flex-wrap:wrap;flex-
wrap:wrap}} .government-module--page--3ihGK .government-module--missionSection--1n5_j .government-
module--logoContainer--3EBWR li{margin:20px 0} .government-module--page--3ihGK .government-module--
missionSection--1n5_j .government-module--logoContainer--3EBWR li
img{width:150px!important;height:auto!important}@media screen and (max-width:767px){.government-module--
page--3ihGK .government-module--missionSection--1n5_j .government-module--logoContainer--3EBWR
li{width:48%}} .government-module--page--3ihGK .government-module--missionSection--1n5_j .government-
module--logoContainer--3EBWR li img{width:auto} .government-module--page--3ihGK .government-module--
contactSection--1IxQQ>div:first-child{margin:0 auto;max-width:520px} .government-module--page--3ihGK
.government-module--formWrapper--3KVA9{width:700px;max-width:90%;margin:50px auto auto}@media screen

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and (min-width:768px){.government-module--page--3ihGK .government-module--formWrapper--3KVA9{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.government-module--page--3ihGK .government-module--formWrapper--3KVA9 .government-module--textareaContainer--3XSY{padding:0;-ms-flex-preferred-size:100%;flex-basis:100%;height:120px}.government-module--page--3ihGK .government-module--compliance--Q5rFv{font-size:14px;color:#829494;margin:25px 0}.government-module--page--3ihGK .government-module--thankYou--3pp4v{margin-top:50px}.government-module--formInput--1cCde{margin:10px 0;padding:10px;border:2px solid rgba(130,148,148,.25);border-radius:4px;width:100%}@media screen and (min-width:768px){.government-module--formInput--1cCde{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:5px}}.government-module--formInput--1cCde textarea{width:100%;height:100%;padding:10px;border:none;resize:none;font-size:14px}.government-module--formInput--1cCde textarea::-webkit-input-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea::-moz-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea:-ms-input-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea::placeholder{color:#829494;font-size:14px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--headerThree--CC-6d{color:#173361;font-size:28px;font-weight:500;margin-bottom:30px;text-align:left}@media screen and (max-width:767px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--headerThree--CC-6d{font-size:21px}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--fullWidthWrapper--1VTyF{text-align:left;margin:40px 0}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--fullWidthWrapper--1VTyF p{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--pageSectionContent--27N0j{padding:50px 0}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO table{width:100%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td{padding:10px 0;width:25%;text-align:center}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td:first-of-type{text-align:left;padding-left:20px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL{text-transform:uppercase;color:#0074a2;font-size:12px;background-color:#b4e1e4}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td span{display:block}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td:first-of-type{color:#000;font-weight:700}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableHeaders--1E2Se{display:-ms-flexbox;display:flex}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O{color:#c5832e;font-size:18px;font-weight:700;letter-spacing:normal;text-transform:uppercase;font-weight:500}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O{font-size:14px}}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O span{display:block}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO svg{width:25px;height:25px;-ms-transform:rotate(-90deg);transform:rotate(-90deg);background:transparent;border-radius:50%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO circle{fill:transparent;stroke:#173361;stroke-width:16;stroke-dasharray:0 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO tr:nth-

of-type(odd){background-color:#e6f5fb}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-4--2H9nU{stroke-dasharray:51 51}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-3--2T3IP{stroke-dasharray:37.5 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-2--1RpIo{stroke-dasharray:25 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-1--1u5c0{stroke-dasharray:12.5 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-0--3OY8d{stroke-dasharray:0 0;stroke-width:1}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardSectionWrapper--2g240{margin-top:50px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardSectionWrapper--2g240 h3{margin:50px 0}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF{border:2px solid rgba(130,148,148,.25);margin:10px 0}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF{-ms-flex:1 1;flex:1 1;margin:5px;-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);max-width:calc(50% - 10px)}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI{-ms-flex-preferred-size:100%;flex-basis:100%;max-width:100%}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ{display:-ms-flexbox;display:flex}}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div{-ms-flex:1 1;flex:1 1}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div:not(:last-of-type){margin-bottom:30px}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div:not(:last-of-type){margin-right:30px;margin-bottom:0}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI p:not(:last-of-type){margin-bottom:20px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--image--1fr2P{width:400px;max-width:100%;height:auto;-o-object-fit:cover;object-fit:cover;-ms-flex-item-align:start;align-self:flex-start}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--image--1fr2P{margin-top:20px}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;height:100%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p div{-ms-flex:1 1;flex:1 1}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p a{text-align:center}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p img{margin-top:25px;height:320px}.apache-vs-pulsar-

module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF h3{ color:#173361 }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section{ padding-bottom:0 }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section.apache-vs-pulsar-module--summary--1QHv0{ padding-bottom:100px }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section.apache-vs-pulsar-module--summary--1QHv0 p{ color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin:20px 0 }.style-module--customerStories--WM-QE{ display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-wrap:wrap;flex-wrap:wrap }.style-module--customerStories--WM-QE .style-module--card--T-iTb{ width:calc(33% - 10px) } @media screen and (max-width:767px){ .style-module--customerStories--WM-QE .style-module--card--T-iTb{ margin-bottom:20px;width:100% } }.style-module--customerStories--WM-QE .style-module--card--T-iTb.style-module--noCard--1o0Rp{ box-shadow:none }.style-module--customerStories--WM-QE .style-module--imageContainer--2lXR1:not(.style-module--fullWidth--1\_LRn){ height:80px }.style-module--customerStories--WM-QE .style-module--imageContainer--2lXR1:not(.style-module--fullWidth--1\_LRn) img{ height:100%;width:auto }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs{ color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left;min-width:350px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h4{ color:#8e9093;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-transform:uppercase }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5{ color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5 a{ color:#173361;position:relative }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5 .style-module--arrow--3aY5x{ position:absolute;right:-15px;top:6px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs ul{ list-style:none;margin:0 20px;padding:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li{ margin-bottom:5px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li h6{ display:inline-block;padding-bottom:5px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT{ display:inline-block!important;margin-left:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT h6{ border-bottom-color:#babe0;cursor:help }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT ul{ margin:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tagline--283Q\_ { top:5px;margin-top:5px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tagline--283Q\_ .style-module--taglineText--2HXa\_ { color:#81cfe2;font-size:8px;font-weight:700;letter-spacing:1.43px;position:absolute;top:-12px;left:0;text-transform:uppercase }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--licenseContainer--19yT6{ position:relative;right:-5px;display:-ms-inline-flexbox;display:inline-flex;-ms-flex-direction:column;flex-direction:column }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--licenseContainer--19yT6+.style-module--taglineText--2HXa\_ { left:11px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--

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licenseContainer--19yT6+h6{border-bottom:none;padding-bottom:0}.style-module--
productFeatureListingLicenseLegend--NqHMT{padding:0;list-style:none;text-align:left}.style-module--
productFeatureListingLicenseLegend--NqHMT .style-module--licenseContainer--19yT6{display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-bottom:3px}.style-module--
productFeatureListingLicenseLegend--NqHMT .style-module--licenseContainer--19yT6>i{position:relative;left-
5px;margin-bottom:0}.style-module--productFeatureListingLicenseLegend--NqHMT .style-module--
licenseContainer--19yT6>span{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--license--3SFD4{margin-top:2px;margin-bottom:2px;border-
radius:50%;height:10px;width:10px;display:inline-block}.style-module--license--3SFD4:first-child{margin-
top:0}.style-module--license--3SFD4:last-child{margin-bottom:0}.style-module--license--3SFD4.style-module--
oss--1HiEF{background:#000}.style-module--license--3SFD4.style-module--community--
UzeSP{background:#b78142}.style-module--license--3SFD4.style-module--commercial--
2qBc3{background:#81cfe2}.style-module--form--Fb2IX{max-width:470px;margin:0 auto;width:100%}.style-
module--form--Fb2IX h4{color:#173361;font-size:18px;font-weight:700;margin-bottom:25px}.style-module--form-
Fb2IX .style-module--input--2JBor{line-height:1.9;padding-left:20px;padding-right:20px}.style-module--form--
Fb2IX .style-module--agreement--3H1Wu{color:#829494;font-size:10px;font-weight:300;line-height:2;margin-
top:15px}.style-module--form--Fb2IX .style-module--agreement--3H1Wu a{color:#829494;text-
decoration:underline}.style-module--form--Fb2IX .style-module--ctaContainer--3Ib9C{margin-top:30px}.style-
module--thankyou--IoZ3P{color:#173361;font-size:28px;font-weight:700}.trust-and-security-module--
trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj{padding-bottom:0}.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj:last-of-type{padding-
bottom:100px}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj
h3{font-size:40px;font-weight:500}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-
module--noCardSection--rpkKy{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}@media screen and (min-width:768px){.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-
security-module--noCardSection--rpkKy{width:50%}}@media screen and (min-width:768px){.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}}.trust-and-
security-module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW p{margin-
bottom:100px;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW .trust-and-security-module--
card--2nTeP{border:3px solid hsla(0,0%,96.1%,.85);margin:10px;padding:15px}@media screen and (min-
width:768px){.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--
2DSJW .trust-and-security-module--card--2nTeP{-ms-flex-preferred-size:calc(33.33% - 20px);flex-
basis:calc(33.33% - 20px)}}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--
cardSection--2DSJW .trust-and-security-module--card--2nTeP>div{text-align:center}.trust-and-security-module--
trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW .trust-and-security-module--card--
2nTeP img{width:70px;height:auto}@media screen and (max-width:991px){.what-is-apache-kafka-module--page--
1gMfr .what-is-apache-kafka-module--hero--1oBKZ>div{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--hero--1oBKZ .what-is-apache-kafka-module--imageContainer--
3TVGK{display:block;margin-left:0;margin-top:60px}}.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--hero--1oBKZ .what-is-apache-kafka-module--imageContainer--3TVGK img{border:9px
solid #81cfe2;cursor:pointer}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaCompanySection--3iQT6 .what-is-apache-kafka-module--logoContainer--1njON{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-
apache-kafka-module--logoContainer--1njON>div{-ms-flex-positive:0;flex-grow:0;-ms-flex-negative:1;flex-

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shrink:1;-ms-flex-preferred-size:20%;flex-basis:20%;margin:20px 0}@media screen and (max-width:991px){.what-
is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-
apache-kafka-module--logoContainer--1njON>div{-ms-flex-preferred-size:33.33333%;flex-
basis:33.33333%}}@media screen and (max-width:991px) and (max-width:575px){.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-apache-kafka-module--
logoContainer--1njON>div{-ms-flex-preferred-size:100%;flex-basis:100%}}.what-is-apache-kafka-module--page--
1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--
1JCvj{text-align:left}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section-
-3nQ7u{display:-ms-flexbox;display:flex;-ms-flex-align:start;align-items:flex-start;padding:50px 0}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-
kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u:nth-child(2n){-ms-flex-
direction:row-reverse;flex-direction:row-reverse}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-
kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-
module--section--3nQ7u:nth-child(2n)>div:first-child{margin-right:0;margin-left:80px}.what-is-apache-kafka-
module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--section--3nQ7u:nth-child(odd)>div:first-child{margin-
right:80px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u>div{-ms-flex:1
1;flex:1 1}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u>div:first-
child{max-width:200px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section-
-3nQ7u h4{color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal;margin:0 0 25px}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-
kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u p{color:rgba(0,0,0,.85);font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0}.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--ebookSection--1F9gz .what-is-apache-kafka-module--card--22EH0{padding:55px}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-
module--container--1JCvj{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-
module--container--1JCvj{-ms-flex-direction:column-reverse;flex-direction:column-reverse;-ms-flex-
align:center;align-items:center}}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
toolsetSection--3LYlq .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--content--
MHnSy{-ms-flex:1 1;flex:1 1;text-align:left;min-width:380px;color:rgba(0,0,0,.85);font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0}@media screen and (max-width:767px){.what-is-apache-kafka-
module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--content--MHnSy{min-width:0}}.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--container--
1JCvj .what-is-apache-kafka-module--content--MHnSy p{margin-bottom:20px}.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--container--
1JCvj .what-is-apache-kafka-module--content--MHnSy .what-is-apache-kafka-module--ctaContainer--
3WaCb{margin-top:40px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
toolsetSection--3LYlq .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--content--
MHnSy .what-is-apache-kafka-module--ctaContainer--3WaCb a:first-child{margin-right:20px;margin-
bottom:20px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--imageContainer--3TVGK{-ms-
flex:1 1;flex:1 1;max-width:440px;margin-left:60px}@media screen and (max-width:767px){.what-is-apache-

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kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYIq .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--imageContainer--3TVGK{margin-left:0;margin-
bottom:20px} .style-module--pageList--3Lp5m h2{text-align:left;margin:0 0 50px}@media screen and (max-
width:991px){.style-module--pageList--3Lp5m h2{text-align:center}}.style-module--pageList--3Lp5m .style-
module--card--1Oi2-{background:hsla(0,0%,96.1%,.85)}.style-module--pageList--3Lp5m .style-module--
featureSection--2oJmJ{padding-top:25px;padding-bottom:50px}.style-module--pageList--3Lp5m .style-module--
featureSection--2oJmJ .style-module--cta--1oBkM{margin-top:50px}.style-module--pageList--3Lp5m .style-
module--upcomingSection--11yLX{padding-top:50px}.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4{display:-ms-flexbox;display:flex;-ms-flex-
pack:justify;justify-content:space-between}@media screen and (max-width:991px){.style-module--pageList--
3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--2Blb4{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--1wo0p{margin-
bottom:50px} .style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--
2Blb4 .style-module--filterContainer--1wo0p>{*margin-left:10px;display:inline-block}@media screen and (max-
width:991px){.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--
2Blb4 .style-module--filterContainer--1wo0p>{*margin-bottom:10px}}.style-module--pageList--3Lp5m .style-
module--upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--
1wo0p>div{width:180px}@media screen and (max-width:575px){.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--1wo0p>button,.style-
module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--
filterContainer--1wo0p>div{width:100%}}.style-module--pageList--3Lp5m .style-module--upcomingSection--
11yLX .style-module--card--1Oi2-,.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX
.style-module--card--1Oi2- h3{color:#173361}@media screen and (max-width:767px){.style-module--pageList--
3Lp5m .style-module--upcomingSection--11yLX .style-module--card--1Oi2- .style-module--imageContainer--
2jiv2{display:none}}.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--
pagination--XYbB4{margin-top:100px}.style-module--pageList--3Lp5m .style-module--subscribeSection--24ic1
h3{color:#173361}.style-module--pageList--3Lp5m .style-module--subscribeSection--24ic1 p{width:90%}.style-
module--pageList--3Lp5m .style-module--noResults--1__V8{color:#000;font-size:28px;font-weight:500;text-
align:center;width:100%}.style-module--itemsWrapper--14yen{display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between;padding-left:0;margin-
bottom:0}.style-module--itemsWrapper--14yen .style-module--itemWrapper--RRnC6{margin:10px;text-
align:left;display:-ms-flexbox;display:flex}@media screen and (max-width:991px){.style-module--itemsWrapper--
14yen .style-module--itemWrapper--RRnC6{-ms-flex:0 1 100%!important;flex:0 1 100%!important}}.style-
module--itemsWrapper--14yen .style-module--itemContainer--2depM{display:-ms-
flexbox;display:flex;width:100%;text-decoration:none}.style-module--itemsWrapper--14yen .style-module--icon--
1rFOr{width:33px;height:33px;vertical-align:top;margin-right:10px;-ms-flex-negative:0;flex-shrink:0}.style-
module--itemsWrapper--14yen .style-module--itemContent--8xqYY{-ms-flex:1 1;flex:1 1}.style-module--
itemsWrapper--14yen .style-module--title--28I2K{font-size:18px;font-weight:700;color:#38cccd;line-
height:1.2;margin:0 0 10px;padding:0}.style-module--itemsWrapper--14yen .style-module--summary--
RCDk6{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;width:90%}.style-
module--itemsWrapper--14yen .style-module--tagline--2UXR8{font-size:12px;letter-spacing:1.2px;font-
weight:500;color:#8e9093;text-transform:uppercase;margin:0 0 10px}.style-module--itemsWrapper--14yen .style-
module--bulletPointList--ppPyb{color:rgba(0,0,0,.85);font-size:14px;font-weight:300;line-height:1.63;-ms-flex:1
1;flex:1 1;list-style-type:disc;padding:0 0 20px}.style-module--itemsWrapper--14yen .style-module--
bulletPointList--ppPyb li{margin-bottom:5px}.style-module--itemsWrapper--14yen .style-module--bulletPointList--
ppPyb li:last-child{margin-bottom:0}.style-module--itemsWrapper--14yen .style-module--ctaContainer--
QdgIZ{margin-top:auto}.style-module--itemsWrapper--14yen .style-module--ctaContainer--QdgIZ a{border-

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bottom:2px solid transparent;line-height:2;margin-bottom:-2px;text-decoration:none;color:#173361 }.style-module--
itemsWrapper--14yen .style-module--ctaContainer--QdgIZ a:hover{ border-bottom-color:#38cccd }.style-module--
itemsWrapper--14yen .style-module--ctaIcon--3oViO{ width:25px;height:25px;-ms-flex-negative:0;flex-shrink:0;-
ms-flex-item-align:center;align-self:center;margin-left:5px }.style-module--itemsWrapper--14yen .style-module--
ctaIcon--3oViO svg{ width:100%;height:100%;fill:#0074a2 }.style-module--itemsWrapper--14yen .style-module--
button--Dp9Wg{ margin-top:20px }.get-involved-module--helpfulLinks--3_ckN p{ margin-bottom:100px }.get-
involved-module--helpfulLinks--3_ckN .get-involved-module--item--2VYcO{ border:2px solid
rgba(130,148,148,.25);padding:20px;border-radius:4px }.get-involved-module--helpfulLinks--3_ckN .get-involved-
module--item--2VYcO h4{ color:#173361 }.get-involved-module--helpfulLinks--3_ckN .get-involved-module--item-
-2VYcO ul{ list-style-type:none;padding-left:0 }.get-involved-module--cardWrapper--3LJmC{ border:2px solid
rgba(130,148,148,.25);border-radius:4px;padding:20px;text-align:left;margin:10px 0 }.get-involved-module--
cardWrapper--3LJmC h5{ font-size:18px;font-weight:700;color:#173361;margin:10px 0 }.get-involved-module--
cardWrapper--3LJmC li,.get-involved-module--cardWrapper--3LJmC p,.get-involved-module--cardWrapper--
3LJmC strong{ margin:10px 0 }.s-dotted-line-module--svgGroup--2jY-S{ stroke:#f5f5f5;stroke-opacity:.85;stroke-
width:7;stroke-miterlimit:10;stroke-linecap:round;stroke-linejoin:round }.lp-module--cloudPaid--3tJKb{ overflow-
x:hidden;overflow-y:scroll }.lp-module--cloudPaid--3tJKb h3{ color:#173361;font-size:28px;font-weight:500 }.lp-
module--cloudPaid--3tJKb .lp-module--primaryCta--3cJf0{ position:relative;z-index:2 }.lp-module--cloudPaid--
3tJKb .lp-module--heroWrapper--1xp8_{ position:relative }.lp-module--cloudPaid--3tJKb .lp-module--heroWrapper-
-1xp8_ .lp-module--heroImageContainer--3zPeI{ position:absolute;max-width:none;right:-50px;top:80px;z-
index:1 } @media screen and (min-width:1690px){ .lp-module--cloudPaid--3tJKb .lp-module--heroWrapper--1xp8_
.lp-module--heroImageContainer--3zPeI{ max-width:400px;position:static } } @media screen and (max-
width:1550px){ .lp-module--cloudPaid--3tJKb .lp-module--heroWrapper--1xp8_ .lp-module--heroImageContainer--
3zPeI{ max-width:400px;position:static } } .lp-module--cloudPaid--3tJKb .lp-module--heroSummary--
1IiQn{ margin:20px 0 }.lp-module--cloudPaid--3tJKb .lp-module--heroCtaContainer--2I2so{ display:block;margin-
top:0 }.lp-module--cloudPaid--3tJKb .lp-module--heroItem--1feeF{ margin:30px 0;position:relative;z-
index:2 } @media screen and (min-width:768px){ .lp-module--cloudPaid--3tJKb .lp-module--heroItem--1feeF{-ms-
flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% - 20px)!important } } .lp-module--cloudPaid--
3tJKb .lp-module--heroItem--1feeF h4{ color:#173361;font-weight:lighter } .lp-module--cloudPaid--3tJKb .lp-
module--providerContent--1RhDi{ position:relative } @media screen and (max-width:991px){ .lp-module--cloudPaid-
-3tJKb .lp-module--providerContent--1RhDi{ width:90%;margin:auto;text-align:center } } .lp-module--cloudPaid--
3tJKb .lp-module--doMoreSection--3iPHv h4,.lp-module--cloudPaid--3tJKb .lp-module--providerContent--1RhDi
h4{ color:#173361 }.lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--3iPHv p,.lp-module--cloudPaid--
3tJKb .lp-module--providerContent--1RhDi p{ font-size:16px;font-weight:lighter;line-height:25px;margin:25px
0 } @media screen and (min-width:992px){ .lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--3iPHv p,.lp-
module--cloudPaid--3tJKb .lp-module--providerContent--1RhDi p,.lp-module--cloudPaid--3tJKb .lp-module--
providerSummary--JM8tX{ width:500px } } .lp-module--cloudPaid--3tJKb .lp-module--providerContentWrapper--
2CQ-L{ position:relative }.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF{ display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:center;align-
items:center;padding:0 } @media screen and (max-width:991px){ .lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF{-ms-flex-direction:column-reverse;flex-direction:column-reverse } } .lp-module--
cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF>{*{z-index:1 }.lp-module--cloudPaid--3tJKb .lp-
module--providerSectionWrapper--3UeyF .lp-module--providerContent--1RhDi h4{ color:#173361;font-
size:18px }.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerContent--1RhDi a:first-of-type{ margin-right:10px } @media screen and (max-width:991px){ .lp-module--
cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--providerContent--1RhDi a:first-of-
type{ margin-bottom:20px } } .lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-
module--providersWrapper--24zGt{ padding:20px;background:#fff;border-radius:8px } @media screen and (min-
width:768px){ .lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--

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providersWrapper--24zGt{position:relative;left:20px}}.lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF .lp-module--providersWrapper--24zGt h5{margin:0 0 10px
5px;color:#173361}.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerBoxWrapper--26EGb{display:-ms-flexbox;display:flex}@media screen and (max-width:991px){.lp-
module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--providerBoxWrapper--
26EGb{-ms-flex-direction:column;flex-direction:column}}.lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF .lp-module--providerBoxWrapper--26EGb a{-ms-flex:1 1;flex:1 1}@media screen
and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerBoxWrapper--26EGb a{margin:10px 0}}.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--
17Rcb{position:absolute;max-width:none;z-index:0;top:-550px;left:-638px;display:none}@media screen and (min-
width:992px){.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--17Rcb{display:block}}@media screen and
(max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--17Rcb{top:-390px;left:-677px}}.lp-
module--cloudPaid--3tJKb .lp-module--mobileConnectors--2IzTp{margin:40px 0;width:100%}@media screen and
(min-width:992px){.lp-module--cloudPaid--3tJKb .lp-module--mobileConnectors--2IzTp{display:none}}@media
screen and (min-width:992px){.lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--
3iPHv{position:absolute;right:0;bottom:-677px}}@media screen and (min-width:992px){.lp-module--cloudPaid--
3tJKb .lp-module--democratizeSection--2vvoL{margin-top:700px;position:relative}}.lp-module--cloudPaid--3tJKb
.lp-module--democratizeSection--2vvoL .lp-module--contentWrapper--1Xboe{padding:20px 30px;border:7px solid
hsla(0,0%,96.1%,.85);border-radius:8px;background-color:#fff;display:-ms-flexbox;display:flex}@media screen
and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
contentWrapper--1Xboe{-ms-flex-direction:column;flex-direction:column;padding:20px}}@media screen and
(max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
textContent--2TwDa{text-align:center}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-
module--textContent--2TwDa p{font-size:16px;font-weight:lighter}.lp-module--cloudPaid--3tJKb .lp-module--
democratizeSection--2vvoL .lp-module--content--4CKtc p{font-size:16px;font-weight:lighter;max-
width:100%;line-height:25px}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
cliWrapper--3tA0m{-ms-flex:1 1;flex:1 1;position:relative;top:130px;left:80px;left:10px;border-radius:8px;box-
shadow:0 0 12px 0 rgba(0,0,0,.25);border:7px solid #fff;background-color:rgba(0,0,0,.25)}@media screen and
(max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
cliWrapper--3tA0m{top:0;left:0;margin-top:50px}}@media (min-width:1250px){.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m{left:80px}}@media screen and (min-
width:768px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--
3tA0m .lp-module--languages--iyhEB .lp-module--languagesDropDownMobile--2LY7x{display:none}}.lp-module-
cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages-
iyhEB .lp-module--languagesSelectDesktop--3tw1K{display:none}@media screen and (min-width:768px){.lp-
module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--
languages--iyhEB .lp-module--languagesSelectDesktop--3tw1K{display:block}}.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages--iyhEB span{margin-
right:30px;font-weight:700;cursor:pointer;position:relative}.lp-module--cloudPaid--3tJKb .lp-module--
democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages--iyhEB span.lp-module--active-
29vL5:after{content:"";position:absolute;bottom:-14px;background-color:#0074a2;width:120%;height:2px;left:-
10%}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-
module--languages--iyhEB hr{margin:10px 0;border-top:1px solid #829494}.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--
HUVpw{position:relative;height:290px;width:600px}@media screen and (max-width:1199px){.lp-module--
cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--
HUVpw{height:520px;width:100%;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-
between}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m

```

.lp-module--cliCode--HUVpw div{position:absolute;top:0;width:100%;height:100%;opacity:0;pointer-events:none;transition:all .3s ease}@media screen and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--HUVpw div{top:20px}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--HUVpw div.lp-module--active--29vL5{opacity:1;pointer-events:all}@media screen and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--HUVpw div>{\*{word-break:break-word}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc{padding:40px;background:#f5f5f5;font-size:14px;font-weight:500}@media screen and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc{padding:40px 20px}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc .red{color:#d8365d}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc .blue{color:#173361}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc .gray{color:#829494;font-weight:lighter}.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--1mOwj,.lp-module--cloudPaid--3tJKb .lp-module--svgBlueDotWrapper--3UNbd{display:none}@media screen and (min-width:1200px){.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--1mOwj,.lp-module--cloudPaid--3tJKb .lp-module--svgBlueDotWrapper--3UNbd{display:block}}.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--1mOwj{position:absolute;bottom:-297px;left:400px}.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--1mOwj img{max-width:none}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--getStartedContentWrapper--jep6M{position:relative}@media screen and (min-width:1200px){.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--getStartedContentWrapper--jep6M{padding-top:100px}}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--contentWrapper--1Xboe{text-align:center}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--contentWrapper--1Xboe p{width:700px;max-width:100%;margin:40px auto 8rem;font-weight:lighter}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--svgBlueDotWrapper--3UNbd{position:absolute;left:-450px;top:150px}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt{-ms-flex-direction:column;flex-direction:column}}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt img{margin:0 40px;height:25px;width:auto}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt img{margin:20px 0;-o-object-fit:contain;object-fit:contain}}.lp-module--cloudPaid--3tJKb .lp-module--pricingTierClassName--1v6FQ,.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3\_>div{-ms-flex-preferred-size:33.33%;flex-basis:33.33%}.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3\_>div:last-of-type{display:none}.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3\_>div:nth-of-type(1n) div{display:block}.lp-module--cloudPaid--3tJKb .lp-module--accordionWrapper--8x0YM{border:7px solid hsla(0,0%,96.1%,.85);max-height:70px;margin-bottom:10px}.lp-module--cloudPaid--3tJKb .lp-module--accordionWrapper--8x0YM div{background-color:transparent}.lp-module--cloudPaid--3tJKb .lp-module--indicator--nT6oI{top:30px}.lp-module--cloudPaid--3tJKb .lp-module--productClassName--3GJrk>div:first-of-type{text-align:center;color:#0074a2}.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O{margin:50px auto;text-align:center}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}}.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O button{margin-right:20px;min-width:333px}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O button{margin-bottom:20px;margin-right:0}}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection-

-2pAxi{padding-top:0}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--heroSection--2-NgW{text-align:center}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--heroSection--2-NgW p{margin:40px auto 100px}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--card--3pJXp{background-color:hsla(0,0%,96.1%,.85)}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--startupProgram--1GBXj{text-align:center}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--startupProgram--1GBXj p{width:800px;max-width:100%;margin:50px auto;line-height:1.66}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--eligibilityItem--2RhUl,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--whatYouGetItem--3qEMr{padding:20px;background-color:#fff}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--eligibilitySummary--1Du4x{margin-bottom:100px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--titleEyebrow--VeLOp{margin-top:100px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT{width:800px;margin:auto;max-width:100%}@media screen and (min-width:768px){.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT+button{margin:50px 0}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formInput--jPIzn,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--select--3heGZ,.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset{margin:5px}@media screen and (min-width:768px){.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formInput--jPIzn,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--select--3heGZ,.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px)}}.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset label{font-size:16px;color:#173361;text-align:left;width:100%;margin-left:5px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset label+div{margin:5px 0!important}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--textareaContainer--1eQLn{padding:0;-ms-flex-preferred-size:calc(100% - 10px);flex-basis:calc(100% - 10px);height:120px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea{width:100%;height:100%;padding:10px;border:2px solid hsla(0,0%,73.3%,.5);border-radius:4px;resize:none;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::-webkit-input-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::-moz-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea:-ms-input-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--compliance--1zJwM{font-size:14px;color:#829494}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F{text-align:left;border:2px solid rgba(130,148,148,.25);border-radius:4px;padding:20px;margin:10px 0}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F h4{font-size:16px;color:#173361;font-weight:700}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F p{font-weight:lighter}.style-module--congratsSection--2EQP8{transition:all .3s ease;position:absolute;top:-30px;width:100%}.style-module--congratsSection--2EQP8.style-module--deb--2TX30 .style-module--congratsSummary--TFgxt,.style-module--congratsSection--2EQP8.style-module--docker--2a\_E .style-module--congratsSummary--TFgxt,.style-module--congratsSection--2EQP8.style-module--rpm--2E0-u .style-module--congratsSummary--TFgxt{margin-top:0}.style-module--congratsSection--2EQP8.style-module--deb--2TX30 .style-module--congratsCardContainer--m4sNv,.style-module--congratsSection--2EQP8.style-module--docker--2a\_E .style-module--congratsCardContainer--m4sNv,.style-module--congratsSection--2EQP8.style-module--rpm--2E0-u .style-module--congratsCardContainer--

m4sNv{margin-top:25px}.style-module--congratsSection--2EQP8 h4{font-size:12px;color:#38cccd;letter-spacing:1.2px;text-transform:uppercase;margin-top:30px}.style-module--congratsSection--2EQP8 .style-module--congratslinkBelow--2UKCQ{font-size:28px;color:#173361;font-weight:500}.style-module--congratsSection--2EQP8 .style-module--congratsPrimaryCta--3W1pw{margin:25px 0}.style-module--congratsSection--2EQP8 .style-module--congratsCardSummary--2iw1g{font-size:14px;text-align:center;margin-bottom:15px}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCardSummary--2iw1g{font-size:16px;margin-bottom:20px}}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt{color:#000;font-size:15px;width:450px;max-width:95%;margin:20px auto 0}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:first-of-type{margin-bottom:70px}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:nth-of-type(2n){width:90%;margin:auto;position:relative}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:nth-of-type(2n):after{content:"";width:100%;height:7px;position:absolute;left:0;right:0;background-color:hsla(0,0%,96.1%,.85);top:-40px}.style-module--congratsSection--2EQP8 .style-module--congratsCardContainer--m4sNv{margin-top:45px;display:-ms-flexbox;display:flex}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR{background-color:hsla(0,0%,96.1%,.85);margin:0 5px;padding:15px;-ms-flex:1 1;flex:1 1;border-radius:4px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR{padding:25px}}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR h5{margin-top:0;margin-bottom:10px;-ms-flex:1 1;flex:1 1}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR h5{margin-bottom:25px}}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR a{-ms-flex-item-align:end;align-self:flex-end}.style-module--cloudInlineContainer--3RAR4{position:absolute;top:-30px;width:100%;opacity:0;pointer-events:none;transition:all .3s ease}.style-module--cloudInlineContainer--3RAR4.style-module--active--1YH-z{opacity:1;pointer-events:auto}.style-module--cloudInlineContainer--3RAR4 .style-module--title--2Ke9N{margin:40px 0 35px;font-size:25px}@media screen and (min-width:768px){.style-module--cloudInlineContainer--3RAR4 .style-module--title--2Ke9N{font-size:28px}}.style-module--cloudInlineContainer--3RAR4 .style-module--summary--3Mwdf{font-size:14px;font-weight:700;width:80%;margin:auto auto 30px}.index-module--downloadPage--1B\_hx h1{margin-bottom:100px}.index-module--downloadPage--1B\_hx .index-module--downloadHeroContent--58OwQ{width:100%;important}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X{display:-ms-flexbox;display:flex}}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--tos--359VS{display:none}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--tosUS--1UABB{display:block}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--forminputWrapper--3mlZa>div{margin-bottom:10px}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--forminputWrapper--3mlZa>div{margin-bottom:100px}}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--customerSupport--38442,.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--existingAccount--2srAO{margin:10px 0}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--submitButton--2h0Vq{margin-top:0}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--submitButton--2h0Vq{margin-top:30px}}.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o{padding:17px;background-color:#fff;margin:0 10px;border-radius:8px;-ms-flex:1 1;flex:1 1;transition:all .4s ease}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o.index-module--active--1NdXX{transform:scale3d(1.1,1.1,1.1);box-shadow:0 0 40px

rgba(0,116,162,.2)} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_{margin-bottom:50px}@media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_{margin-bottom:0} } .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_ .index-module--cardHero--1ArYr{background-color:#0074a2} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_platform--3vE12 .index-module--checkboxWrapper--2fIXh{padding-left:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_platform--3vE12 .index-module--cardHero--1ArYr{background-color:#38cccd} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;padding:25px 0;border-radius:8px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr svg{width:40px;height:40px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr h2{color:#fff;margin:0 0 15px;font-size:20px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT{position:relative} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU{transition:all .3s ease} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_cloud--3nrz\_ .index-module--inactive--2BK4x, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x{opacity:0;visibility:hidden;pointer-events:none}@media screen and (max-width:991px){ .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7 .index-module--solutionListItem--17-tZ, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x .index-module--solutionListItem--17-tZ{padding:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7 .index-module--solutionCta--2m2qB, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x .index-module--solutionCta--2m2qB{display:none} } .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_cloud--3nrz\_ .index-module--summary--35fZk{font-weight:500} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT h3{margin:30px 0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--summary--35fZk{margin:0 auto 40px;width:80%;font-size:16px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--summary--35fZk{margin-bottom:40px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE img{height:18px;width:auto;margin:0 10px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItemContainer--2floM div:first-of-type{margin-right:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ{background-color:hsla(0,0%,96.1%,.85);padding:15px;border-radius:4px;margin:5px}@media screen and (min-width:992px){ .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--

solutionListItem--17-tZ{-ms-flex-preferred-size:calc(50% - 10px)!important;flex-basis:calc(50% - 10px)!important} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ h4{color:#173361;font-size:16px;margin-bottom:5px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ  
 svg{width:25px;height:25px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionCta--2m2qB{display:block;margin:30px auto 20px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--linkWrapper--AHrEN{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN{font-size:12px;color:#0074a2;font-weight:500;text-transform:uppercase} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN:first-of-type{margin-right:10px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN:last-of-type{margin-left:10px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u{width:100%;margin:5px}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u{width:calc(50% - 10px);max-width:220px}} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::-webkit-input-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::-moz-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::ms-input-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--customerSupport--38442,.index-module--downloadPage--1B\_hx .index-module--existingAccount--2srAO{text-align:center;font-size:14px;margin:10px 0} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh{position:relative;width:100%;margin:0 0 20px;color:rgba(0,0,0,.7);text-align:left}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh{padding-left:33px}} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh input{position:absolute;opacity:0;cursor:pointer;height:0;width:0} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh label{cursor:pointer;padding-left:30px} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh .index-module--checkboxContainer--32hB2{display:block;position:relative;margin-top:12px;-webkit-user-select:none;-moz-user-select:none;-ms-user-select:none;user-select:none} .index-module--downloadPage--1B\_hx .index-module--tos--359VS{font-size:12px;margin-top:20px} .index-module--downloadPage--1B\_hx .index-module--tos--359VS p{font-size:12px;width:80%;margin:auto;line-height:1.4;color:#829494;text-align:center;line-height:20px} .index-module--downloadPage--1B\_hx .index-module--us--tw5hJ .index-module--tos--359VS{display:none} .index-module--downloadPage--1B\_hx .index-module--us--tw5hJ .index-module--tosUS--1UABB{display:block} .index-module--downloadPage--1B\_hx .index-module--submitButton--2h0Vq{margin-top:0} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7{position:absolute;font-size:14px;padding:17px 50px;left:50%;width:448px;max-width:90%;-ms-transform:translateX(-50%);transform:translateX(-50%);background-color:#fbebef;transition:all .3s ease-in-out;opacity:0;visibility:hidden;border-radius:4px;text-align:center;z-index:10} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 p{text-align:center;font-size:13px;color:#d8365d} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 p:first-of-type{font-weight:700;font-size:15px} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 .index-module--show--3U7qP{opacity:1;visibility:visible} .index-module--downloadPage--1B\_hx .index-module--disabled--1CF62{opacity:.4;pointer-events:none} .index-module--downloadPage--1B\_hx .index-module--automatedInput--1LpO0 div,.index-module--downloadPage--1B\_hx .index-module--automatedInput--1LpO0 li{text-transform:capitalize} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4{width:100%} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-webkit-input-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-moz-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::ms-input-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--

1jFp4::placeholder{ color:#173361 }.index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div{ display:inline-block;width:100%;margin-top:10px } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div{ width:calc(50% - 5px) } }.index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div:first-of-type{ margin-right:10px }.index-module--downloadPage--1B\_hx .index-module--communityForm--b6DJm,.index-module--downloadPage--1B\_hx form[name=platform-download]{ width:468px;max-width:95%;margin:auto }.index-module--downloadPage--1B\_hx .index-module--inputWrapper--QNdWD{ display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;margin-bottom:5px } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--inputWrapper--QNdWD{ margin-bottom:50px } }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4{ border:2px solid rgba(130,148,148,.25);border-radius:4px;margin-bottom:10px;font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-webkit-input-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-moz-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4:-ms-input-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--checkboxLabelWrapper--2nB\_R{ display:-ms-flexbox;display:flex;margin-top:15px }.index-module--downloadPage--1B\_hx .index-module--checkboxLabelWrapper--2nB\_R input{ position:absolute;top:0;left:5px }.index-module--downloadPage--1B\_hx .index-module--checkbox--2DhQ3{ width:20px;height:20px }.index-module--downloadPage--1B\_hx .index-module--label--3oQpp{ margin-left:30px;font-size:13px;text-align:left;font-weight:lighter }.index-module--downloadPage--1B\_hx .index-module--disclaimer--VRFBN{ color:#829494;font-size:12px;width:80%;margin:10px auto 0 } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--disclaimer--VRFBN{ margin:20px auto 0 } } @media screen and (min-width:992px){ .style-module--cyojButtons--1HfVa{-ms-flex:0 1 440px;flex:0 1 440px} }.style-module--cyojButtons--1HfVa .style-module--cyojButtonItemContainer--37zsn{ display:-ms-flexbox;display:flex } @media screen and (max-width:991px){ .style-module--cyojButtons--1HfVa .style-module--cyojButtonItemContainer--37zsn{-ms-flex-pack:center;justify-content:center} }.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH{-ms-flex:0 1 100% !important;flex:0 1 100% !important;max-width:385px;padding:20px 15px;transition:all .3s ease;background-color:#c4eff2}.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH:hover{ cursor:pointer;background-color:#d7eff6;-ms-transform:translateX(2px);transform:translateX(2px)}.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH h4{ color:#000 }.index-module--page--2ZXnp .index-module--featuresSection--3SDMM{ border-bottom:1px solid #979797 }.index-module--page--2ZXnp .index-module--heroButton--IQFhB{ margin-top:70px }.index-module--page--2ZXnp .index-module--videoSection--251ZS{ display:none;padding-bottom:0;margin-bottom:15px }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h{ padding-bottom:50px }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_{ display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column;text-align:left } @media screen and (min-width:992px){ .index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_{ -ms-flex-direction:row;flex-direction:row;padding:80px 0 }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_:first-child{ padding-top:0 } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_h4{ color:#173361;font-size:28px;font-weight:500;margin:10px 0 25px } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_p{ color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left;max-width:100%;margin-bottom:50px } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>img{ margin:40px 0;max-width:80% } @media screen and (min-width:992px){ .index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>img{ max-width:500px;width:50%;margin:0 } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>div{ padding-bottom:20px } @media screen and (min-

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width:992px){.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_>div{margin-right:80px;width:50%}}@media screen and (min-width:992px){.index-module--page--2ZXnp
.index-module--howWeWorkSection--qf78h .index-module--content--3rXH_:nth-child(2n){-ms-flex-direction:row-
reverse;flex-direction:row-reverse}}@media screen and (min-width:992px){.index-module--page--2ZXnp .index-
module--howWeWorkSection--qf78h .index-module--content--3rXH_:nth-child(2n)>div{margin-right:0;margin-
left:80px}}.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_:last-child>img{box-shadow:0 7px 22px 0 rgba(0,0,0,.18)}.index-module--page--2ZXnp .index-module--
howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--vPfYP{margin-
bottom:30px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}@media screen and (min-
width:768px){.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_ .index-module--ctaContainer--vPfYP{text-align:left}}.index-module--page--2ZXnp .index-module--
howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--vPfYP
img{margin:0}.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_ .index-module--ctaContainer--vPfYP svg{margin-right:10px;width:30px}.index-module--page--2ZXnp
.index-module--howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--
vPfYP>a{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;border-bottom:2px
solid transparent;line-height:2;margin-bottom:-2px;text-decoration:none;text-transform:uppercase}.index-module--
page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--
ctaContainer--vPfYP>a:hover{border-bottom-color:#38cccd}.index-module--page--2ZXnp .index-module--
testimonial--1zkxh{background-color:transparent;border-radius:8px;margin:0 25px;border-bottom:1px solid
hsla(0,0%,59.2%,.44)}@media screen and (max-width:767px){.index-module--page--2ZXnp .index-module--
testimonial--1zkxh{border-radius:0;margin-left:0;margin-right:0}}.index-module--page--2ZXnp .index-module--
testimonial--1zkxh .index-module--carousel--3r2kH>div{background:hsla(0,0%,96.1%,.85);border-
radius:6px}.index-module--page--2ZXnp .index-module--testimonial--1zkxh .index-module--
indexPagerClassName--2tStW{overflow-x:hidden}@media screen and (max-width:991px){.index-module--page--
2ZXnp .index-module--testimonial--1zkxh .index-module--indexPagerClassName--2tStW{overflow-
x:scroll}}.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L>div{padding:20px 15px}@media screen
and (max-width:991px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L>div{text-align:center;-ms-
flex-direction:column;flex-direction:column;padding:50px 15px}}.index-module--page--2ZXnp .index-module--
testCyoj2--1fi8L .index-module--mainContent--1VUgb{width:100%}@media screen and (min-
width:992px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L .index-module--mainContent--
1VUgb{width:70%}}@media screen and (min-width:992px){.index-module--page--2ZXnp .index-module--
testCyoj2--1fi8L .index-module--rightContent--16YCw{-ms-flex:0 1 440px;flex:0 1 440px}}@media screen and
(max-width:991px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L .index-module--rightContent--
16YCw{margin-top:50px}}.index-module--introSection--2wiS_{padding-bottom:15px}@media screen and (min-
width:768px){.index-module--introSection--2wiS_{padding-top:0;margin-top:-75px}}.index-module--introSection-
2wiS_ .index-module--content--2y6NX .index-module--videoContainer--3de4T img{cursor:pointer;max-
width:580px;width:100%;margin-bottom:20px}.index-module--introSection--2wiS_ .index-module--content--
2y6NX .index-module--videoContainer--3de4T p{color:#173361;font-size:16px;line-height:26px}.index-module--
introSection--2wiS_ .index-module--content--2y6NX .index-module--videoContainer--3de4T p small{font-
size:12px;font-weight:300}.index-module--quoteSection--2EqiD{border:7px solid hsla(0,0%,96.1%,.85);border-
radius:8px;padding:100px;margin-top:0;margin-bottom:15px}@media screen and (max-width:767px){.index-
module--quoteSection--2EqiD{padding:50px 25px}}.index-module--quoteSection--2EqiD h4{color:#173361;font-
size:12px;font-weight:500;letter-spacing:1.2px;text-transform:uppercase}.index-module--quoteSection--2EqiD
div{color:#173361;font-size:12px;font-weight:300;text-transform:uppercase}.index-module--quoteSection--2EqiD
blockquote{color:#38cccd;font-size:24px;font-weight:700;font-style:italic;padding:0;border:0;margin:30px 0 0;line-
height:1.3}.index-module--releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-module--
summary--cZ8qe{max-width:600px;width:90%;margin:0 auto}.index-module--releaseCalendarSection--1VSYn

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.index-module--content--2y6NX .index-module--grid--Ab3-o { margin-top: 100px } .index-module--
releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-module--grid--Ab3-o .index-module--card-
-Oaxik { padding: 25px } .index-module--releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-
module--grid--Ab3-o .index-module--card--Oaxik > * { text-align: center } .index-module--releaseCalendarSection--
1VSYn .index-module--content--2y6NX .index-module--grid--Ab3-o .index-module--card--Oaxik h3 { max-
width: 230px; margin: 0 auto; width: 100% } .index-module--releaseCalendarSection--1VSYn .index-module--content--
2y6NX .index-module--grid--Ab3-o .index-module--card--Oaxik .index-module--ctaContainer--P0vas { margin: auto
0 10px } .index-module--stayUpdatedSection--3bMUB .index-module--list--3jzNm li { border: 2px solid
hsla(0,0%,96.1%,.85); border-radius: 4px; padding: 25px } .index-module--stayUpdatedSection--3bMUB .index-
module--list--3jzNm li h4 { color: #173361 } .services-module--sectionContent--3IPMq { margin-top: 25px; margin-
bottom: 25px } .services-module--sectionContent--3IPMq .services-module--featureItem--1emNP { background-
color: #fff; padding: 35px } .services-module--sectionContent--3IPMq .services-module--featureItem--1emNP
h4 { color: #000 } .services-module--professionalServices--2mnoh .services-module--levelsSection--1NwNA
h3 { width: 680px; max-width: 90%; margin: auto; color: #173361 } @media screen and (min-width: 768px) { .services-
module--levelsContainer--1UGhY { display: -ms-flexbox; display: flex; -ms-flex-wrap: wrap; flex-wrap: wrap } } .services-
module--levelsContainer--1UGhY .services-module--levelWrapper--3etJ_ { margin: 0 10px; -ms-flex: 1 1; flex: 1
1 } .services-module--levelsContainer--1UGhY .services-module--levelNumber--01Fe { color: #b78142; font-
size: 24px } .services-module--levelsContainer--1UGhY .services-module--levelTitle--2GkBA { font-
size: 12px; color: #829494; text-transform: uppercase; padding: 15px 0; border-bottom: 2px solid
hsla(0,0%,96.1%,.85) } .services-module--levelsContainer--1UGhY .services-module--levelsCompletedBox--
J_g_h { height: 90px; background: hsla(0,0%,96.1%,.85); display: -ms-flexbox; display: flex; -ms-flex-direction: column-
reverse; flex-direction: column-reverse } .services-module--levelsContainer--1UGhY .services-module--
levelsCompletedBox--J_g_h .services-module--fadeLevelElement--
37r88 { width: 100%; height: 20%; position: relative; display: block } .services-module--levelsContainer--1UGhY
.services-module--levelSubTitle--2Y3Jr { font-size: 14px; padding: 15px 0; color: #173361; border-bottom: 2px solid
hsla(0,0%,96.1%,.85); text-align: left; min-height: 70px } .services-module--levelsContainer--1UGhY .services-
module--levelsUnorderedList--2BRg { list-style-type: disc; padding-left: 5px; font-size: 12px } .services-module--
levelsContainer--1UGhY .services-module--levelsListItem--2Ks7L { text-align: left; margin: 15px 0 } .services-module-
levelsContainer--1UGhY .services-module--level1--1XMHR { background-color: #e6f5fb } .services-module--
levelsContainer--1UGhY .services-module--level2--1mRB6 { background-color: #b4e1e4 } .services-module--
levelsContainer--1UGhY .services-module--level3--1b23n { background-color: #81cfe2 } .services-module--
levelsContainer--1UGhY .services-module--level4--28Iy { background-color: #0074a2 } .services-module--
levelsContainer--1UGhY .services-module--level5--1oRnw { background-color: #173361 } .services-module--
howWeWorkWrapper--2HWk2 { text-align: left; padding: 25px; background-color: #fff; margin-top: 100px } @media
screen and (max-width: 767px) { .services-module--howWeWorkWrapper--2HWk2 { background-
color: hsla(0,0%,96.1%,.85); text-align: center } } .services-module--howWeWorkSectionTitle--3Xxgl { font-
size: 28px; font-weight: 500 } .services-module--engageBulletPointList--34lhS { margin-bottom: 40px; padding-
left: 15px } .services-module--engageBulletPointItem--3LyLB { margin: 15px 0; font-size: 14px } .services-module--
titleTableWrapper--2nAyT { display: -ms-flexbox; display: flex; background-color: hsla(0,0%,96.1%,.85); margin: 15px
0; padding: 25px } @media screen and (max-width: 767px) { .services-module--titleTableWrapper--
2nAyT { display: none } } .services-module--titleTableWrapper--2nAyT .services-module--table--1s4Ut { -ms-flex: 1
1; flex: 1 1 } .services-module--titleTableWrapper--2nAyT .services-module--tableHead--2cWUO { border-bottom: 7px
solid #fff; padding-bottom: 25px; width: 33% } .services-module--titleTableWrapper--2nAyT .services-module--
tableRow--1fegK: not(:last-of-type) { border-bottom: 2px solid #fff } .services-module--titleTableWrapper--2nAyT
.services-module--tableData--2Q4Vf { padding: 15px 0; font-size: 14px } .services-module--titleTableWrapper--2nAyT
.services-module--tableData--2Q4Vf a { color: #0074a2 } .services-module--consultingTitle--3UtoE, .services-module--
tableTitle--2qtfX { margin: 0 60px 0 0; width: 15ch; line-height: 1.2; letter-spacing: 1.2px } .services-module--
consultingWrapper--2FSj7 { padding: 75px 25px; display: -ms-flexbox; display: flex; background-

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color:hsla(0,0%,96.1%,.85)}@media screen and (max-width:767px){.services-module--consultingWrapper--
2FSj7{display:none}}.services-module--mobileSectionWrapper--3Y5aQ{text-align:center}@media screen and
(min-width:768px){.services-module--mobileSectionWrapper--3Y5aQ{display:none}}.services-module--
mobileSectionWrapper--3Y5aQ .services-module--mobileTitle--1kNDb{padding-bottom:30px;border-bottom:7px
solid #fff}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileList--1nV-2{list-style-
type:none;padding-left:0}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileList--1nV-
2,.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR{padding:12px
0}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR{border-bottom:2px
solid #fff}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR
a{color:#173361}.services-module--ctaButton--3iqVy{margin-top:100px}.training-module--training--3zAl6
.training-module--item--i_dAy{padding:30px 20px;background-color:#fff}.training-module--training--3zAl6
.training-module--item--i_dAy h4{color:#173361}.training-module--training--3zAl6 .training-module--
jumpWrapper--3wumc{margin-top:50px}@media screen and (min-width:768px){.training-module--training--3zAl6
.training-module--jumpWrapper--3wumc{display:-ms-flexbox;display:flex}}.training-module--training--3zAl6
.training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz{display:-ms-
flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-preferred-size:calc(50% -
100px);flex-basis:calc(50% - 100px);margin:50px}@media screen and (min-width:768px){.training-module--
training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--
1CcRz{margin:50px 90px}}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-
module--jumpItemWrapper--1CcRz .training-module--icon--J6e5z{width:64px;height:64px;margin:auto}.training-
module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz
h4{margin-top:20px;font-size:28px;font-weight:500;color:#173361}.training-module--training--3zAl6 .training-
module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz p{margin:20px 0;-ms-flex:1 1 flex:1
1}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper-
1CcRz a{-ms-flex-item-align:center;align-self:center}.training-module--training--3zAl6 .training-module--
learningPathsWrapper--392uo .training-module--summary--jGfIP{width:800px;max-
width:90%;margin:auto}.training-module--training--3zAl6 .training-module--mainTile--2qI8h{margin-
top:50px;background-color:#173361;padding:40px;color:#fff;border-radius:8px}.training-module--training--3zAl6
.training-module--mainTile--2qI8h h4{margin-bottom:20px}.training-module--training--3zAl6 .training-module--
mainTile--2qI8h p{font-weight:lighter;color:hsla(0,0%,96.1%,.85)}@media screen and (min-
width:768px){.training-module--training--3zAl6 .training-module--columnWrapper--vqs_A{display:-ms-
flexbox;display:flex}}.training-module--training--3zAl6 .training-module--trackColumn--3JQ0P{-ms-flex-
preferred-size:100%;flex-basis:100%}@media screen and (min-width:768px){.training-module--training--3zAl6
.training-module--trackColumn--3JQ0P{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% -
10px);margin:0 5px}}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie{margin:40px
0}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h3,.training-module--training--3zAl6
.training-module--trackWrapper--2n2Ie h4{font-weight:700;color:#173361}.training-module--training--3zAl6
.training-module--trackWrapper--2n2Ie h4{font-size:21px;padding-
bottom:40px;margin:0;position:relative}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie
h4:before{display:none}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-
module--trackWrapper--2n2Ie h4:before{display:block}}.training-module--training--3zAl6 .training-module--
trackWrapper--2n2Ie h3{font-size:18px;margin-bottom:20px}.training-module--training--3zAl6 .training-module--
trackWrapper--2n2Ie p{font-size:16px}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie
.training-module--contentWrapper--7vfjv{background-color:#d7eff6;padding:40px;border-
radius:8px;position:relative;min-height:240px}.training-module--training--3zAl6 .training-module--trackWrapper--
2n2Ie .training-module--contentWrapper--7vfjv p{color:#000}.training-module--training--3zAl6 .training-module--
contentWrapper--7vfjv.training-module--dottedLine--3LVdy:before,.training-module--training--3zAl6 .training-
module--trackWrapper--2n2Ie h4:before{content:"";width:2px;height:25px;border:1px dashed

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#829494;position:absolute;left:50%;top:-30px }.training-module--training--3zA16 .training-module--competitiveList-
-1v2ZW h4{font-weight:500;font-size:14px;line-height:15px;color:#173361;letter-spacing:.1em;text-
transform:uppercase }.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-
module--competitiveListItemWrapper--xvg6L{margin-top:50px } @media screen and (min-width:768px){.training-
module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--
competitiveListItemWrapper--xvg6L{display:-ms-flexbox;display:flex }}.training-module--training--3zA16
.training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L a{-ms-flex:1
1;flex:1 1 }.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--
competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo{background-color:#b4e1e4;-
ms-flex-preferred-size:100%;flex-basis:100%;margin:30px 0;padding:35px 40px;border-
radius:8px;position:relative } @media screen and (min-width:768px){.training-module--training--3zA16 .training-
module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--
competitiveListItem--9CGyo{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:0
5px }}.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--
competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo svg{position:absolute;top:-
17px;left:calc(50% - 17px)} @media screen and (min-width:768px){.training-module--training--3zA16 .training-
module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--
competitiveListItem--9CGyo svg{left:calc(50% - 8px)}}.training-module--training--3zA16 .training-module--
competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--
competitiveListItem--9CGyo h5{font-weight:700;font-size:18px;line-height:23px;text-
align:center;color:#173361 }.training-module--training--3zA16 .training-module--resourceItem--jSSBu{-ms-flex-
preferred-size:100%!important;flex-basis:100%!important;background-color:#fff;padding:25px;margin:5px
0;border-radius:8px }.training-module--training--3zA16 .training-module--resourceItem--jSSBu
h4{color:#173361 }.training-module--training--3zA16 .training-module--contactSection--2NDa0
h3{color:#173361;width:700px;max-width:95%;margin:0 auto 20px }.training-module--training--3zA16 .training-
module--formWrapper--5h42K{max-width:600px;margin:40px auto 0 } @media screen and (min-
width:768px){.training-module--training--3zA16 .training-module--formWrapper--5h42K{display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-wrap:wrap;flex-wrap:wrap }}.training-
module--training--3zA16 .training-module--formWrapper--5h42K .training-module--formInputDiv--
3SCsU,.training-module--training--3zA16 .training-module--formWrapper--5h42K input{-ms-flex-preferred-
size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:5px }.training-module--training--3zA16 .training-module--
formWrapper--5h42K .training-module--state--1dtzQ{opacity:0;pointer-events:none;transition:all .2s ease }.training-
module--training--3zA16 .training-module--formWrapper--5h42K .training-module--show--
1A9cH{opacity:1;pointer-events:auto }.training-module--training--3zA16 .training-module--formWrapper--5h42K
button{margin:50px auto 0 } @media screen and (max-width:767px){.training-module--training--3zA16 .training-
module--formWrapper--5h42K button{margin-top:25px;margin-left:0 }}.training-module--training--3zA16 .training-
module--formWrapper--5h42K textarea{width:100%;height:100%;padding:10px;border:none;resize:none;font-
size:14px;border:2px solid rgba(130,148,148,.25);border-radius:4px }.training-module--training--3zA16 .training-
module--formWrapper--5h42K textarea::-webkit-input-placeholder{color:#829494;font-size:14px }.training-module-
-training--3zA16 .training-module--formWrapper--5h42K textarea::-moz-placeholder{color:#829494;font-
size:14px }.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea:-ms-input-
placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--formWrapper--
5h42K textarea::placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--
formWrapper--5h42K .training-module--textareaContainer--3x7vs{-ms-flex-preferred-size:100%;flex-
basis:100% }.training-module--training--3zA16 .training-module--disclaimer--3ahJU{font-weight:300;font-
size:16px;color:#829494;margin-top:25px }.training-module--training--3zA16 .training-module--thankYou--
1Yrzn{margin-top:50px;font-size:20px }.style-module--imageContainer--bXGzM img{width:250px } @media screen
and (max-width:767px){.style-module--logosContentContainer--28fgQ{padding:50px }} @media screen and (min-

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width:768px){.style-module--logosContent--3FV2R{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}}.style-module--logos--3A4oE{height:80px;width:auto;max-width:180px;-o-object-fit:contain;object-fit:contain}@media screen and (max-width:767px){.style-module--logos--3A4oE{display:block;margin:50px auto}}.style-module--whyWrapper--1wuBn{background-color:#fff;padding:65px 15px 0}@media screen and (min-width:992px){.style-module--whyWrapper--1wuBn{padding:100px 150px 65px !important}}.style-module--whyWrapper--1wuBn .style-module--whySummary--3z6Nx{margin-bottom:50px}.style-module--whyWrapper--1wuBn .style-module--item--1__t0{-ms-flex:0 1 300px !important;flex:0 1 300px !important;margin-bottom:50px}.style-module--whyWrapper--1wuBn .style-module--item--1__t0 h5{color:#173361}@media screen and (min-width:992px){.style-module--whyWrapper--1wuBn .style-module--item--1__t0{-ms-flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% - 20px)!important}}.style-module--whyWrapper--1wuBn .style-module--item--1__t0>div:first-child{margin-right:15px}.style-module--whyWrapper--1wuBn .style-module--copy--22gHW{font-weight:300;line-height:1.86;color:#000;font-size:14px;text-align:center;margin-top:37px;margin-bottom:85px}.style-module--featuresSummary--1SUmP{width:800px;max-width:90%;margin:0 auto 50px}@media screen and (min-width:768px){.style-module--ctaContentWrapper--1LgW6{display:-ms-flexbox;display:flex}}.style-module--ctaItem--2ZJ67{-ms-flex:1 1;flex:1 1;position:relative}@media screen and (min-width:768px){.style-module--ctaItem--2ZJ67:first-of-type:after{content:"";width:2px;height:100%;top:0;background-color:rgba(130,148,148,.25);position:absolute:right:0}}@media screen and (max-width:991px){.style-module--ctaItem--2ZJ67{margin:50px auto}}.style-module--ctaItem--2ZJ67 h3{width:80%;margin:0 auto 30px;font-size:18px;font-weight:700;color:#173361}.style-module--tryConfluent--msw3g{max-width:990px;margin:0 auto}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF{text-align:center;background-color:#fff;position:relative;border-radius:4.2px;width:100%}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF{position:relative;min-height:328px;margin:0;max-width:480px}}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF:first-child{margin-right:30px}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF:last-child .style-module--content--Yu3YZ{margin-bottom:0}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF h5{color:rgba(0,0,0,.85);font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF h5{font-size:21px}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF p{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin-top:30px;min-height:80px}@media screen and (max-width:767px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF p{min-height:auto;margin-bottom:35px}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--smallTitle--257dk{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-transform:uppercase}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--icon--20nvY{position:absolute;left:50%;-ms-transform:translateX(-50%);transform:translateX(-50%);top:-30px}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--content--Yu3YZ{padding:53px 40px 30px;margin-bottom:60px;border-radius:4.2px}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--content--Yu3YZ{margin-bottom:0}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--ctaContainer--1q6Xl{margin-bottom:40px}.style-module--tryConfluent--msw3g .style-module--disclaimer--2Z9-a{margin:15px;font-size:14px;font-weight:700;line-height:1.79;text-align:left}.style-module--tooltip--2A6h4{display:inline-block;position:relative;vertical-align:top;margin-left:3px}.style-module--

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tooltip--2A6h4.underline.style-module--bottomRight--Gz-Xz{position:absolute;left:0;width:100%;border-
bottom:1px solid #babad0;margin-left:0}.style-module--tooltip--2A6h4.underline .style-module--hidden--
k4GRS{width:250px;left:-70px}.style-module--tooltip--2A6h4.underline .style-module--hidden--
k4GRS:before{display:none}.style-module--tooltip--2A6h4.underline .style-module--default--
1Q4QX{opacity:0;pointer-events:none}.style-module--tooltip--2A6h4 p{color:#4a4a4a;font-size:12px;font-
weight:300;letter-spacing:.4px;line-height:1.5;margin:0}.style-module--tooltip--2A6h4 .style-module--default--
1Q4QX{border-radius:20px;border:1px solid #8e9093;color:#8e9093;font-size:8px;padding:1px 5px}.style-module-
-tooltip--2A6h4 .style-module--content--3mxKy{transition:opacity .25s ease-in-out}.style-module--tooltip--2A6h4
.style-module--content--3mxKy.style-module--hidden--k4GRS{background:#fff;border:1px solid
#eee;opacity:0;position:absolute;pointer-events:none;margin:20px 5px;padding:10px;z-index:20}.style-module-
tooltip--2A6h4 .style-module--content--3mxKy.style-module--arrow--1YkB5{margin:30px 5px}.style-module-
tooltip--2A6h4 .style-module--content--3mxKy.style-module--arrow--
1YkB5:before{content:"";display:block;position:absolute;width:0;height:0;border-left:10px solid
transparent;border-right:10px solid transparent;border-bottom:10px solid #fff}.style-module--tooltip--2A6h4.style-
module--bottomRight--Gz-Xz .style-module--default--1Q4QX+div{top:0;left:-20px}.style-module--tooltip--
2A6h4.style-module--bottomRight--Gz-Xz>div:before{top:-8px;left:14px}.style-module--tooltip--2A6h4.style-
module--bottomLeft--viYel .style-module--default--1Q4QX+div{top:0;left:-224px}.style-module--tooltip--
2A6h4.style-module--bottomLeft--viYel>div:before{top:-8px;left:214px}.style-module--tooltip--2A6h4: hover
.style-module--hidden--k4GRS{opacity:1;pointer-events:auto}@media (max-width:576px){.style-module--tooltip--
2A6h4{display:none}}.confluent-platform-module--page--108H6 .confluent-platform-module--heroSection--3-7Yr
.confluent-platform-module--content--1j_Al{max-width:820px;width:100%}.confluent-platform-module--page--
108H6 .confluent-platform-module--recognition--1oskr{background:rgba(180,225,228,.3);padding:31px 0
40px}@media screen and (min-width:768px){.confluent-platform-module--page--108H6 .confluent-platform-
module--recognition--1oskr{padding:186px 0 40px}}.confluent-platform-module--page--108H6 .confluent-
platform-module--recognition--1oskr .confluent-platform-module--pager--sIXL4{-ms-flex-pack:distribute;justify-
content:space-around}.confluent-platform-module--page--108H6 .confluent-platform-module--recognition--1oskr
.confluent-platform-module--pager--sIXL4 li{margin-left:10px;margin-right:10px}.confluent-platform-module-
page--108H6 .confluent-platform-module--recognition--1oskr .confluent-platform-module--pager--sIXL4 li:first-
child{margin-left:0}.confluent-platform-module--page--108H6 .confluent-platform-module--recognition--1oskr
.confluent-platform-module--pager--sIXL4 li:last-child{margin-right:0}.confluent-platform-module--page--108H6
.confluent-platform-module--boxShadowContainer--1f1Pk{background-color:#fff;padding:100px 0}@media screen
and (min-width:992px){.confluent-platform-module--page--108H6 .confluent-platform-module--
boxShadowContainer--1f1Pk{padding:100px 45px 60px}}@media screen and (min-width:992px){.confluent-
platform-module--page--108H6 .confluent-platform-module--boxShadowContainer--1f1Pk .confluent-platform-
module--benefitsWrapper--1XJqz{-ms-flex-pack:space-evenly;justify-content:space-evenly}}@media screen and
(min-width:992px){.confluent-platform-module--page--108H6 .confluent-platform-module--boxShadowContainer--
1f1Pk .confluent-platform-module--benefitsItem--1Y0HU{-ms-flex-negative:0;flex-shrink:0;-ms-flex-
positive:1;flex-grow:1;-ms-flex-preferred-size:calc(33% - 20px)!important;flex-basis:calc(33% -
20px)!important;margin-bottom:40px}}.confluent-platform-module--page--108H6 .confluent-platform-module-
benefitSection--2IVM6,.confluent-platform-module--page--108H6 .confluent-platform-module--storySection--
3XSuj{background:rgba(180,225,228,.3)}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module-
featuresFor--c_v5R{margin-top:80px}@media screen and (min-width:768px){.style-module-
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R{display:-ms-flexbox;display:flex;-
ms-flex-pack:center;justify-content:center}}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-
module--featuresFor--c_v5R ul{list-style-type:none;padding-left:0}.style-module-
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R ul li{color:rgba(0,0,0,.85);font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:center;background-
color:rgba(180,225,228,.3);margin:8px 0;border-radius:2px;padding:5px 0;text-decoration:underline}.style-module-

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-confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R h5{ font-size:14px;font-
weight:700;text-align:center;color:#0074a2;margin:21px auto 35px;width:60%;text-transform:uppercase } @media
screen and (min-width:768px){.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
featuresFor--c_v5R h5{ width:70% }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
featuresFor--c_v5R>div{border:6px solid #f3f4f7;-ms-flex:0 1 33%;flex:0 1 33%;padding:30px 30px
50px;position:relative}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--
c_v5R>div:first-of-type{border-bottom:0}@media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div:first-of-type{ border-bottom:6px
solid #f3f4f7;border-left:6px solid #f3f4f7 }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-
module--featuresFor--c_v5R>div:last-of-type{ border-top:0}@media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div:last-of-type{border-top:6px solid
#f3f4f7;border-right:6px solid #f3f4f7 }} @media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div{border-width:6px 3px;padding-
bottom:30px }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R .style-
module--title--2n Pun{padding:9px 35px;border-radius:6px;background-color:hsla(0,0%,96.1%,.85);font-
size:12px;font-weight:500;letter-spacing:2.67px;color:#173361;position:absolute;-ms-transform:translate(-50%,-
54px);transform:translate(-50%,-54px);text-transform:uppercase}.style-module--confluentPlatformBenefitPersonas-
-3PCk0 .style-module--featureApacheKafka--NzqQR{padding:30px;background-
color:hsla(0,0%,96.1%,.85)} @media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featureApacheKafka--NzqQR{margin:0 5px }}.style-
module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featureApacheKafka--NzqQR span{font-
size:18px;font-weight:700;color:#0074a2}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
platformAdjectives--25Kx4{border:6px solid #f3f4f7;margin-top:20px}@media screen and (min-
width:768px){.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--
25Kx4{margin:5px }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives-
-25Kx4 ul{list-style-type:none;display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-
around;padding:20px 0}@media screen and (max-width:991px){.style-module--confluentPlatformBenefitPersonas--
3PCk0 .style-module--platformAdjectives--25Kx4 ul{-ms-flex-direction:column;flex-direction:column }}.style-
module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul:first-of-
type{border-bottom:1px dashed #d4d0d0}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
platformAdjectives--25Kx4 ul:first-of-type li{-ms-flex:0 1 33%;flex:0 1 33% }.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul
li{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;-ms-flex:0 1 25%;flex:0 1
25%;margin:10px 0}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--
25Kx4 ul li.style-module--highlight--hT6ki{color:#173361;font-size:18px;font-weight:700;text-
transform:uppercase;-ms-flex:1 1 40%;flex:1 1 40% } @media screen and (max-width:991px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul li.style-module--highlight-
-hT6ki{-ms-flex-order:-1;order:-1 }}.style-module--content--2ruvk{text-align:center}.style-module--formContainer-
-1XMLD{height:auto;top:50%;margin-top:0;width:100%;max-width:700px;min-
height:420px;position:relative;border-radius:5px}.style-module--formContainer--1XMLD form .style-module--
buttonContainer--3C_YP{width:100%;margin:20px 0}.style-module--formContainer--1XMLD form .style-module-
-select--1OhVX{-webkit-appearance:none;letter-spacing:1px;border:1.1px solid #ecef2;font-
size:12px;background:#fff;width:100%;text-transform:uppercase;text-
align:left;color:rgba(0,0,0,.7);position:relative;padding:0}.style-module--formContainer--1XMLD form .style-
module--select--1OhVX>div{padding:0 10px}.style-module--formContainer--1XMLD form .style-module--select-
1OhVX>div:first-child{padding:10px 0 10px 25px;cursor:pointer;text-align:left}.style-module--formContainer-
1XMLD form .style-module--select--1OhVX.style-module--error--2nMVD{border:1px solid #df2d58}.style-
module--formContainer--1XMLD form .style-module--select--1OhVX.style-module--error--2nMVD .style-module-

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-3_n0T{border-right-color:#df2d58;border-left-color:#df2d58;border-bottom-color:#df2d58}.style-module-
-formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T{position:absolute;left:-1px;right:-1px;z-index:9;background:#fff;border-right:1.1px solid #e99999;border-
left:1.1px solid #e99999;border-bottom:1.1px solid #e99999;top:43px;transition:max-height .5s ease-in-
out;overflow:hidden;max-height:0;border-bottom-left-radius:4px;border-bottom-right-radius:4px;border-top-left-
radius:0;border-top-right-radius:0;text-align:left}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--options--3_n0T>div{margin-bottom:10px;padding:10px 10px
20px;background:#edf0f5;position:relative}.style-module--formContainer--1XMLD form .style-module--select--
1OhVX .style-module--options--3_n0T h6{display:inline-block;font-size:12px;margin:10px 0;color:#000;font-
weight:500}.style-module--formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T ul{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-
content:space-between;text-align:left;margin:0;list-style:none;padding:0}.style-module--formContainer--1XMLD
form .style-module--select--1OhVX .style-module--options--3_n0T ul li{background:#fff;-ms-flex:1 1;flex:1 1;text-
align:center;border:1px solid #e3e4e5;border-radius:4px;font-size:12px;text-transform:uppercase;font-
weight:300;letter-spacing:1px;color:#000;margin:0 10px 0 0;padding:10px 0;cursor:pointer;line-
height:1.2;width:calc((100% - 30px)/2)}.style-module--formContainer--1XMLD form .style-module--select--
1OhVX .style-module--options--3_n0T ul li:hover{background-color:rgba(37,123,215,.5);color:#fff;font-
weight:500}.style-module--formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T ul li.style-module--selected--3IV6f{background-color:#257bd7;color:#fff;font-weight:500}.style-module--
formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--3_n0T .style-module--
divider--1qB1j{position:absolute;top:-20px;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);border:3px solid #fff;width:30px;height:30px;text-align:center;border-radius:50%;background:#f7f9fc;font-
weight:700;text-transform:uppercase}.style-module--formContainer--1XMLD form .style-module--select--1OhVX
.style-module--arrow--CsSfj{width:20px;height:20px;display:inline-
block;top:24px;right:20px;left:auto;position:absolute}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:after,.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:before{content:"";position:absolute;background-
color:#8e9093;width:15px;height:1px;transition:all .4s cubic-bezier(1,.07,.28,1.04)}.style-module--formContainer--
1XMLD form .style-module--select--1OhVX .style-module--arrow--CsSfj:before{-ms-
transform:rotate(45deg);transform:rotate(45deg)}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:after{-ms-transform:rotate(-45deg);transform:rotate(-
45deg);left:11px}.style-module--formContainer--1XMLD form .style-module--select--1OhVX.style-module--
expanded--1Lbrq{border-bottom:0;border-bottom-left-radius:0;border-bottom-right-radius:0}.style-module--
formContainer--1XMLD form .style-module--select--1OhVX.style-module--expanded--1Lbrq .style-module--
options--3_n0T{max-height:220px}.style-module--formContainer--1XMLD form .style-module--select--
1OhVX.style-module--expanded--1Lbrq .style-module--arrow--CsSfj:before{-ms-
transform:rotate(135deg);transform:rotate(135deg)}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX.style-module--expanded--1Lbrq .style-module--arrow--CsSfj:after{-ms-transform:rotate(-
135deg);transform:rotate(-135deg);left:11px}.style-module--formContainer--1XMLD .style-module--titleContainer-
-WVppj h6{display:inline-block;font-size:16px;font-weight:500;color:#2a2a2d;margin-bottom:24px}.style-module-
-formContainer--1XMLD .style-module--titleContainer--WVppj .tooltip-hidden{left:-200px!important}.style-
module--checkboxWrapper--2IEzb{position:relative;width:100%;margin-top:20px;color:rgba(0,0,0,.7);text-
align:left}.style-module--checkboxWrapper--2IEzb
input{position:absolute;opacity:0;cursor:pointer;height:0;width:0}.style-module--checkboxWrapper--2IEzb
label{cursor:pointer;padding-left:30px}.style-module--checkboxWrapper--2IEzb .style-module--
checkboxContainer--2b_qe{display:block;position:relative;padding-left:35px;margin-top:12px;-webkit-user-
select:none;-moz-user-select:none;-ms-user-select:none;user-select:none}.style-module--tos--3pYRd{font-
size:12px}.style-module--tos--3pYRd p{font-size:12px;width:80%;line-height:1.4;color:rgba(0,0,0,.7);text-

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align:justify;margin:auto auto 15px }.style-module--tosUS--3c4R4,.style-module--us--2ibcg .style-module--tos--3pYRd{display:none }.style-module--us--2ibcg .style-module--tosUS--3c4R4{display:block }.modal-is-visible{overflow:hidden }.modal-is-visible .style-module--formPlatformDownloadModal--1rKbi.style-module--show--2NTMt{top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-50%)}.style-module--accordionItemWrapper--2qcVC{margin-bottom:2px;transition:all .5s ease }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f{max-height:64px;overflow:hidden }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--accordionPanel--19rjo{opacity:0;transition:all .4s ease .1s }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--accordionTitle--1k8jN{cursor:pointer }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--indicator--2cYbX{display:block }.style-module--accordionItemWrapper--2qcVC.style-module--open--2SWVx{overflow:visible }.style-module--accordionItemWrapper--2qcVC.style-module--open--2SWVx .style-module--accordionItem--204fj .style-module--accordionPanel--19rjo{opacity:1 }.style-module--accordionTitle--1k8jN{color:#173361;font-size:18px;font-weight:700;letter-spacing:normal;text-align:left;padding:20px 50px 20px 20px;color:#000;background-color:#e6f5fb;position:relative}@media screen and (max-width:767px){.style-module--accordionTitle--1k8jN{font-size:16px }}.style-module--accordionAltIndicator--F2VHE{display:inline-block;position:absolute;right:2rem }.style-module--indicator--2cYbX{right:50px;position:absolute;top:35px;display:none }.style-module--purple--3ncYI .style-module--accordionTitle--1k8jN{background:rgba(85,29,157,.1);color:#551d9d }.style-module--purple--3ncYI .style-module--accordionItem--204fj{background:rgba(85,29,157,.03) }.style-module--green--3oE7a .style-module--accordionTitle--1k8jN{background:rgba(21,158,134,.1);color:#159e86 }.style-module--green--3oE7a .style-module--accordionItem--204fj{background:rgba(21,158,134,.03) }.style-module--blue--1F6u1 .style-module--accordionTitle--1k8jN{background:rgba(13,172,204,.1);color:#0dacc3 }.style-module--blue--1F6u1 .style-module--accordionItem--204fj{background:rgba(13,172,204,.03) }.style-module--orange--1yfx\_ .style-module--accordionTitle--1k8jN{background:rgba(227,125,98,.1);color:#e37d62 }.style-module--orange--1yfx\_ .style-module--accordionItem--204fj{background:rgba(227,125,98,.03) }.style-module--grey--1DKMw .style-module--accordionTitle--1k8jN{background:rgba(88,120,140,.1);color:#58788c }.style-module--grey--1DKMw .style-module--accordionItem--204fj{background:rgba(88,120,140,.03) }.style-module--tiersSection--1QkAs{display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;margin-top:100px;margin-bottom:50px }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK{-ms-flex-preferred-size:25%;flex-basis:25%;text-align:left }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK>p{font-size:13px;width:60%;margin:20px auto 20px 0 }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod{-webkit-text-decoration-color:#b78142;text-decoration-color:#b78142;cursor:help }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div{border:2px solid #b4e1e4;width:75%!important;padding:20px 40px;border-radius:8px }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div p{text-align:center}@media screen and (max-width:991px){.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div{display:none }}@media screen and (max-width:991px){.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tierctaButtons--1CAwD{padding:10px 12px }}@media screen and (max-width:991px){.style-module--featuresSection--1BRNK,.style-module--tiersSection--1QkAs{display:none }}.style-module--tierTitle--ud9Z0{color:#b78142;font-size:18px;font-weight:700;letter-spacing:normal;margin-bottom:35px;display:block;text-align:left}@media screen and (max-width:991px){.style-module--tierTitle--ud9Z0{text-align:center }}.style-module--tooltip--1tWod{text-decoration:underline;display:block }.style-module--rowTitle--2FP-M{background:hsla(0,0%,96.1%,.85);padding:13px 20px;letter-spacing:1.2px;font-size:18px;font-weight:700;text-align:left}@media screen and (max-width:767px){.style-module--rowTitle--2FP-M{font-size:14px }}.style-module--row--3dCMI{display:-ms-flexbox;display:flex;border:2px solid hsla(0,0%,96.1%,.85) }.style-module--row--3dCMI.style-module--title--3Tzw4{background:hsla(0,0%,96.1%,.85) }.style-module--row--3dCMI .style-module--rowItem--

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3ZC1B {width:25%;text-align:left;padding:13px 0;font-size:13px }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B:first-of-type {font-weight:500}.style-module--row--3dCMI .style-module--rowItem--3ZC1B:first-
of-type div:nth-child(2){font-weight:300;color:rgba(0,0,0,.85);font-size:11px }.style-module--row--3dCMI .style-
module--rowItem--3ZC1B:nth-of-type(3n) div:nth-child(2){margin-bottom:20px } @media screen and (max-
width:991px){.style-module--row--3dCMI .style-module--rowItem--3ZC1B {font-size:12px } }.style-module--row--
3dCMI .style-module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48 {cursor:help;margin-
right:0 } @media screen and (max-width:991px){.style-module--row--3dCMI .style-module--rowItem--3ZC1B
.style-module--rowItemTooltip--1Cd48 {display:block;font-size:12px } }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>span {display:block}.style-module--row--3dCMI .style-
module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>span div:first-child {text-decoration:underline;-
webkit-text-decoration-color:#000;text-decoration-color:#000;max-width:210px }.style-module--row--3dCMI .style-
module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>div {border:1px solid #b4e1e4;text-
transform:none } @media screen and (max-width:991px){.style-module--row--3dCMI .style-module--rowItem--
3ZC1B .style-module--rowItemTooltip--1Cd48>div {display:none } }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B h4 {font-size:12px } @media screen and (max-width:991px){.style-module--row--3dCMI .style-
module--rowItem--3ZC1B h4 {font-size:11px } }.style-module--row--3dCMI .style-module--rowItem--3ZC1B:first-
of-type {padding-left:20px;letter-spacing:1.2px;font-size:12px;text-transform:uppercase }.style-module--disclaimer--
2tlQN {font-size:12px;font-weight:700;line-height:1.79;text-align:right;padding:12px 0 } @media screen and (max-
width:991px){.style-module--disclaimer--2tlQN {display:none } }.style-module--mobileViewWrapper--
2oK4O {display:none } @media screen and (max-width:991px){.style-module--mobileViewWrapper--
2oK4O {display:block } }.style-module--mobileView--3YxAf .style-module--tier--2LItI {margin:50px }.style-module-
mobileView--3YxAf .style-module--tier--2LItI h3 {text-align:center }.style-module--mobileView--3YxAf .style-
module--tier--2LItI p {font-size:12px;margin-bottom:35px }.style-module--mobileView--3YxAf .style-module--
mobileRow--1MKZU {display:-ms-flexbox;display:flex;border:2px solid hsla(0,0%,96.1%,.85);padding:15px 60px
15px 20px;-ms-flex-pack:justify;justify-content:space-between;font-size:14px }.style-module--mobileView--3YxAf
.style-module--mobileRow--1MKZU>div:first-child {text-align:left }.style-module--mobileView--3YxAf .style-
module--mobileRow--1MKZU>div:last-child {text-align:right }.style-module--container--
Fuoc8 {position:relative }.style-module--tabContainer--2EeGI {margin-top:65px;position:relative;display:-ms-
flexbox;display:flex;-ms-flex-pack:center;justify-content:center }.style-module--tabContainer--2EeGI:after,.style-
module--tabContainer--2EeGI:before {content:"";position:absolute;width:35%;top:50%;border:3px solid
hsla(0,0%,96.1%,.85);-ms-transform:translateY(-50%);transform:translateY(-50%)} @media screen and (max-
width:991px){.style-module--tabContainer--2EeGI:after,.style-module--tabContainer--
2EeGI:before {display:none } }.style-module--tabContainer--2EeGI:after {left:0 }.style-module--tabContainer--
2EeGI:before {right:0 }.style-module--tabWrapper--1MIKN {display:-ms-flexbox;display:flex;border:1px solid
#d1d1d1;padding:15px 30px;border-radius:4px;-ms-flex-wrap:wrap;flex-wrap:wrap;text-align:center;z-
index:1;background-color:#fff;cursor:pointer } @media screen and (min-width:992px){.style-module--tabWrapper--
1MIKN:first-of-type {border-radius:4px 0 0 4px;border-right:none } } @media screen and (min-width:992px){.style-
module--tabWrapper--1MIKN:last-of-type {border-left:none;border-radius:0 4px 4px 0 } }.style-module--
tabWrapper--1MIKN.style-module--active--3mpSI {color:#fff;background-color:#173361 }.style-module--
tabSubTitle--3FtQx,.style-module--tabTitle--2Nc3h {width:100%;font-weight:500 }.style-module--tabTitle--
2Nc3h {text-transform:uppercase;font-size:12px;font-stretch:normal;letter-spacing:.76px }.style-module--
tabSubTitle--3FtQx {margin:0;font-size:14px }.style-module--container--30Ip7 {border-radius:8px;margin:50px
0;padding:50px 20px;background:#173361;color:#fff }.style-module--container--30Ip7 a: hover { -webkit-text-
decoration-color:#fff;text-decoration-color:#fff }.style-module--container--30Ip7 a h4 {color:#fff;font-size:21px;font-
weight:700;margin:0;display:inline }.style-module--container--30Ip7 a div {margin-left:7px;display:inline-
block;vertical-align:middle;top:-10px }.rc-slider {position:relative;height:14px;padding:5px 0;width:100%;border-
radius:6px;-ms-touch-action:none;touch-action:none }.rc-slider,* {box-sizing:border-box;-webkit-tap-
highlight-color:rgba(0,0,0,0) }.rc-slider-rail {width:100%;background-color:#e9e9e9 }.rc-slider-rail,.rc-slider-

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track{position:absolute;height:4px;border-radius:6px}.rc-slider-track{left:0;background-color:#abe2fb}.rc-slider-
handle{position:absolute;width:14px;height:14px;cursor:pointer;cursor:-webkit-grab;margin-top:-
5px;cursor:grab;border-radius:50%;border:2px solid #96dbfa;background-color:#fff;-ms-touch-action:pan-x;touch-
action:pan-x}.rc-slider-handle-dragging.rc-slider-handle-dragging.rc-slider-handle-dragging{border-
color:#57c5f7;box-shadow:0 0 0 5px #96dbfa}.rc-slider-handle:focus{outline:none}.rc-slider-handle-click-
focused:focus{border-color:#96dbfa;box-shadow:unset}.rc-slider-handle:hover{border-color:#57c5f7}.rc-slider-
handle:active{border-color:#57c5f7;box-shadow:0 0 5px #57c5f7;cursor:-webkit-grabbing;cursor:grabbing}.rc-
slider-mark{position:absolute;top:18px;left:0;width:100%;font-size:12px}.rc-slider-mark-
text{position:absolute;display:inline-block;vertical-align:middle;text-align:center;cursor:pointer;color:#999}.rc-
slider-mark-text-active{color:#666}.rc-slider-
step{position:absolute;width:100%;height:4px;background:transparent}.rc-slider-dot{position:absolute;bottom:-
2px;margin-left:-4px;width:8px;height:8px;border:2px solid #e9e9e9;background-color:#fff;cursor:pointer;border-
radius:50%;vertical-align:middle}.rc-slider-dot-active{border-color:#96dbfa}.rc-slider-dot-reverse{margin-right:-
4px}.rc-slider-disabled{background-color:#e9e9e9}.rc-slider-disabled .rc-slider-track{background-color:#ccc}.rc-
slider-disabled .rc-slider-dot,.rc-slider-disabled .rc-slider-handle{border-color:#ccc;box-shadow:none;background-
color:#fff;cursor:not-allowed}.rc-slider-disabled .rc-slider-dot,.rc-slider-disabled .rc-slider-mark-text{cursor:not-
allowed!important}.rc-slider-vertical{width:14px;height:100%;padding:0 5px}.rc-slider-vertical .rc-slider-
rail{height:100%;width:4px}.rc-slider-vertical .rc-slider-track{left:5px;bottom:0;width:4px}.rc-slider-vertical .rc-
slider-handle{margin-left:-5px;-ms-touch-action:pan-y;touch-action:pan-y}.rc-slider-vertical .rc-slider-
mark{top:0;left:18px;height:100%}.rc-slider-vertical .rc-slider-step{height:100%;width:4px}.rc-slider-vertical .rc-
slider-dot{left:2px;margin-bottom:-4px}.rc-slider-vertical .rc-slider-dot:first-child,.rc-slider-vertical .rc-slider-
dot:last-child{margin-bottom:-4px}.rc-slider-tooltip-zoom-down-appear,.rc-slider-tooltip-zoom-down-enter,.rc-
slider-tooltip-zoom-down-leave{-webkit-animation-duration:.3s;animation-duration:.3s;-webkit-animation-fill-
mode:both;animation-fill-mode:both;display:block!important;-webkit-animation-play-state:paused;animation-play-
state:paused}.rc-slider-tooltip-zoom-down-appear.rc-slider-tooltip-zoom-down-appear-active,.rc-slider-tooltip-
zoom-down-enter.rc-slider-tooltip-zoom-down-enter-active{-webkit-animation-
name:rcSliderTooltipZoomDownIn;animation-name:rcSliderTooltipZoomDownIn;-webkit-animation-play-
state:running;animation-play-state:running}.rc-slider-tooltip-zoom-down-leave.rc-slider-tooltip-zoom-down-leave-
active{-webkit-animation-name:rcSliderTooltipZoomDownOut;animation-name:rcSliderTooltipZoomDownOut;-
webkit-animation-play-state:running;animation-play-state:running}.rc-slider-tooltip-zoom-down-appear,.rc-slider-
tooltip-zoom-down-enter{-ms-transform:scale(0);transform:scale(0);-webkit-animation-timing-function:cubic-
bezier(.23,1,.32,1);animation-timing-function:cubic-bezier(.23,1,.32,1)}.rc-slider-tooltip-zoom-down-leave{-
webkit-animation-timing-function:cubic-bezier(.755,.05,.855,.06);animation-timing-function:cubic-
bezier(.755,.05,.855,.06)}@-webkit-keyframes rcSliderTooltipZoomDownIn{0%{opacity:0;transform-origin:50%
100%;transform:scale(0)}to{transform-origin:50% 100%;transform:scale(1)}}@keyframes
rcSliderTooltipZoomDownIn{0%{opacity:0;transform-origin:50% 100%;transform:scale(0)}to{transform-
origin:50% 100%;transform:scale(1)}}@-webkit-keyframes rcSliderTooltipZoomDownOut{0%{transform-
origin:50% 100%;transform:scale(1)}to{opacity:0;transform-origin:50% 100%;transform:scale(0)}}@keyframes
rcSliderTooltipZoomDownOut{0%{transform-origin:50% 100%;transform:scale(1)}to{opacity:0;transform-
origin:50% 100%;transform:scale(0)}}.rc-slider-tooltip{position:absolute;left:-9999px;top:-
9999px;visibility:visible}.rc-slider-tooltip,.rc-slider-tooltip *{box-sizing:border-box;-webkit-tap-highlight-
color:rgba(0,0,0,0)}.rc-slider-tooltip-hidden{display:none}.rc-slider-tooltip-placement-top{padding:4px 0 8px}.rc-
slider-tooltip-inner{padding:6px 2px;min-width:24px;height:24px;font-size:12px;line-height:1;color:#fff;text-
align:center;text-decoration:none;background-color:#6c6c6c;border-radius:6px;box-shadow:0 0 4px #d9d9d9}.rc-
slider-tooltip-arrow{position:absolute;width:0;height:0;border-color:transparent;border-style:solid}.rc-slider-tooltip-
placement-top .rc-slider-tooltip-arrow{bottom:4px;left:50%;margin-left:-4px;border-width:4px 4px 0;border-top-
color:#6c6c6c}.style-module--pricingCalculator--D5Y17{position:relative;z-index:1}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17{-ms-flex-direction:column;flex-direction:column}}.style-

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module--pricingCalculator--D5Y17 .style-module--container--2yYu5{display:-ms-flexbox;display:flex}@media
screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--container--2yYu5{-ms-
flex-direction:column;flex-direction:column}}.style-module--pricingCalculator--D5Y17 .style-module--
mainCalculator--YXJeD{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-
direction:column;width:77.8rem}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--mainCalculator--YXJeD{width:100%;-ms-flex-direction:column;flex-direction:column}}.style-
module--pricingCalculator--D5Y17 .style-module--accordion--1Xd_0{height:-webkit-max-content;height:-moz-
max-content;height:max-content}.style-module--pricingCalculator--D5Y17 .style-module--accordionItem--
3qJxX{border:7px solid hsla(0,0%,96.1%,.85);border-radius:8px;min-height:12.5rem;background:#fff;margin-
bottom:1rem}.style-module--pricingCalculator--D5Y17 .style-module--accordionItem--3qJxX:last-of-type{margin-
bottom:0}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--
accordionItem--3qJxX{border:none;max-height:none}}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemActive--1Z_Bc{box-sizing:border-box;background:#fff}.style-module--pricingCalculator--D5Y17
.style-module--accordionItemActive--1Z_Bc .style-module--accordionItemTitle--2H98i{background:#fff;font-
size:2.1rem;font-weight:500}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--accordionItemActive--1Z_Bc .style-module--accordionItemTitle--2H98i{font-size:2.1rem;font-
weight:500}}.style-module--pricingCalculator--D5Y17 .style-module--accordionItemTitle--
2H98i{background:hsla(0,0%,96.1%,.85);font-size:1.8rem;font-weight:400;padding:4.5rem 2rem;transition:all
.35s;position:relative}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-
module--accordionItemTitle--2H98i{font-size:2.1rem;font-weight:500;padding:2rem 3.75rem 0;line-height:1.6;min-
height:0;text-align:center;background:none}}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemTitleRight--3qb7l{color:#173361;font-weight:300;font-size:1.6rem;display:inline-
block;position:absolute;right:2rem}@media screen and (max-width:767px){.style-module--pricingCalculator--
D5Y17 .style-module--accordionItemTitleRight--3qb7l{display:none}}.style-module--pricingCalculator--D5Y17
.style-module--accordionItemTitleValue--131ck{display:inline-block;width:auto;padding-left:1.5rem}.style-
module--pricingCalculator--D5Y17 .style-module--accordionItemIndicator--
1YIUh{display:none!important}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--accordionItemPanel--2tczN{opacity:1!important;padding-left:1.2rem;padding-right:1.2rem;border-
bottom:.7rem solid hsla(0,0%,96.1%,.85)}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemPanel--2tczN:last-of-type{border-bottom:none}}.style-module--pricingCalculator--D5Y17 .style-
module--section1--1-8KW{padding:3.2rem 3.6rem 2.5rem}@media screen and (max-width:767px){.style-module--
pricingCalculator--D5Y17 .style-module--section1--1-8KW{padding:3.2rem 0 2.5rem}}.style-module--
pricingCalculator--D5Y17 .style-module--fieldLabel--3DLKg{font-size:12px;line-height:1.5rem;letter-
spacing:.1rem;padding:.5rem 0;text-transform:uppercase;font-weight:500}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--fieldLabel--3DLKg{font-size:12px;line-
height:1.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--providerContainer--1uY8E{display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerContainer--1uY8E{-ms-flex-
direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--pricingCalculator-
D5Y17 .style-module--ctaContainer--uZcE3{margin-top:6.5rem;text-align:center}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--ctaContainer--uZcE3{display:none}}.style-
module--pricingCalculator--D5Y17 .style-module--sectionButton--3V1mf:hover{color:#0074a2}.style-module--
pricingCalculator--D5Y17 .style-module--providerLabel--1OdUe{width:32%;text-align:center;border-
radius:.4rem;border:1px solid rgba(130,148,148,.25);padding:4rem 0;cursor:pointer}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerLabel--
1OdUe{width:90%;padding:2rem 0}}.style-module--pricingCalculator--D5Y17 .style-module--providerRadio--
2TVAt:checked+.style-module--providerLabel--1OdUe{padding:3.9rem 0;border:2px solid #0074a2}@media
screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerRadio--

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2TVAt:checked+.style-module--providerLabel--1OdUe{padding:1.9rem 0}.style-module--pricingCalculator--
D5Y17 .style-module--providerRadio--2TVAt{-webkit-appearance:none;-moz-
appearance:none;appearance:none;border:none;display:inline;width:0;height:0}.style-module--pricingCalculator--
D5Y17 .style-module--section2--dCKMt{padding:3.2rem 3.6rem 2.5rem}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--section2--dCKMt{padding:3.2rem 0
2.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--regionContainer--3x-x5{display:-ms-
flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--regionContainer--3x-x5{-ms-flex-
direction:column-reverse;flex-direction:column-reverse}}.style-module--pricingCalculator--D5Y17 .style-module--
tip--2PiIS .style-module--tooltip--385jI{border:.2rem solid #d7eff6;border-radius:.8rem;padding:3rem}.style-
module--pricingCalculator--D5Y17 .style-module--tip--2PiIS .style-module--tooltip--385jI p{line-
height:2.5rem;font-size:1.4rem;text-transform:none}.style-module--pricingCalculator--D5Y17 .style-module--
sectionSplit--LnwRO{margin-top:1.5rem;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-
content:space-between}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-
module--sectionSplit--LnwRO{-ms-flex-direction:column;flex-direction:column}}.style-module--pricingCalculator-
D5Y17 .style-module--sectionSplitPart--2IPi_{width:48%;text-align:left}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--sectionSplitPart--2IPi_{text-
align:center;width:auto;margin:.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--
sectionSplitPartRight--1L7Kv{width:48%;text-align:right}@media screen and (max-width:767px){.style-module--
pricingCalculator--D5Y17 .style-module--sectionSplitPartRight--1L7Kv{text-
align:center;width:auto;margin:.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--radioToggle--
FwXVV{display:block}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleContainer--
2AgyV{display:block;padding:0;margin:0;border-radius:2.5rem;background:hsla(0,0%,96.1%,.85)}@media screen
and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--radioToggleContainer--
2AgyV{background:rgba(130,148,148,25)}}.style-module--pricingCalculator--D5Y17 .style-module--
radioToggleRadio--2iXdJ{-webkit-appearance:none;-moz-
appearance:none;appearance:none;border:none;display:inline}.style-module--pricingCalculator--D5Y17 .style-
module--radioToggleLabel--2WfMo{padding:.5rem 0;width:50%;text-align:center;border-
radius:2.5rem;background:transparent;border:2px solid transparent;font-size:12px;color:#829494;text-
transform:uppercase;margin:0;opacity:1}@media screen and (max-width:767px){.style-module--pricingCalculator--
D5Y17 .style-module--radioToggleLabel--2WfMo{padding:.5rem 0}}.style-module--pricingCalculator--D5Y17
.style-module--radioToggleInvalid--2i_eO{opacity:.5;text-decoration:line-through;cursor:not-allowed}.style-
module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:checked+.style-module--
radioToggleLabel--2WfMo{background:#0074a2;color:#fff}.style-module--pricingCalculator--D5Y17 .style-
module--radioToggleRadio--2iXdJ:active+.style-module--radioToggleLabel--2WfMo,.style-module--
pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:focus+.style-module--radioToggleLabel--
2WfMo{border-color:rgba(130,148,148,25)}.style-module--pricingCalculator--D5Y17 .style-module--
radioToggleRadio--2iXdJ:checked:active+.style-module--radioToggleLabel--2WfMo,.style-module--
pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:checked:focus+.style-module--
radioToggleLabel--2WfMo{border-color:#173361}.style-module--pricingCalculator--D5Y17 .style-module--
section3--2NVYM{padding:0 3.6rem 5rem}@media screen and (max-width:767px){.style-module--
pricingCalculator--D5Y17 .style-module--section3--2NVYM{padding:0 0 5rem}}.style-module--pricingCalculator-
D5Y17 .style-module--sliderContainer--1W4g0{margin:.5rem 0 2.5rem}.style-module--pricingCalculator--D5Y17
.style-module--slider--3yHlc{margin:0}@media screen and (max-width:767px){.style-module--pricingCalculator--
D5Y17 .style-module--slider--3yHlc{margin-left:1.5rem;width:calc(100vw - 6rem)}}.style-module--
pricingCalculator--D5Y17 .style-module--display--20DIQ{display:block;width:38.5rem;margin-
left:1.8rem;background:#fff;box-shadow:0 4px 20px rgba(0,0,0,25);border-radius:8px;padding:1.7rem 2.5rem
2.5rem}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplit--

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LnwRO{margin:.8rem 0}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ{width:100%;margin:1rem 0;height:auto;padding:1.6rem}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplit--LnwRO{-ms-flex-direction:row;flex-direction:row}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplitPart--2IPi\_{width:49%;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplitPartRight--1L7Kv{width:49%;text-align:right}}.style-module--pricingCalculator--D5Y17 .style-module--displayHeading--2YFNw{font-size:1.6rem;font-weight:700;color:#173361;margin:0 0 1rem;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayHeadingRight--2YZUJ{font-size:1.6rem;font-weight:700;color:#173361;margin:0 0 1rem;text-align:right}.style-module--pricingCalculator--D5Y17 .style-module--displayLabel--3Czd1{text-transform:uppercase;color:#829494;font-size:1.2rem;letter-spacing:.1em;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayRate--6lzLc{font-size:1.6rem;font-weight:300;white-space:nowrap;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayNumber--19Obs{font-size:2.4rem;font-weight:500;color:#173361;line-height:2}.style-module--pricingCalculator--D5Y17 .style-module--displayButton--2W6-3{width:100%;margin:2rem 0 1rem}.style-module--pricingCalculator--D5Y17 .style-module--displayTotal--3qT-N{font-size:3.5rem;font-weight:700;color:#173361;line-height:1;margin-bottom:1.5rem}.style-module--pricingCalculator--D5Y17 .style-module--marketingText--2XB0U{text-align:center;color:#173361;font-size:1.4rem}.style-module--pricingCalculator--D5Y17 .style-module--displayDiscount--lkCPC{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;padding:1rem 0}.style-module--pricingCalculator--D5Y17 .style-module--discountStripe--1UpvG{-ms-flex-positive:1;flex-grow:1;border-radius:.7rem;height:.7rem;background-color:#c5832e}.style-module--pricingCalculator--D5Y17 .style-module--discountNumber--1cCud{display:inline-block;width:auto;margin-left:1.5rem;color:#c5832e;font-size:1.8rem;font-weight:700}.style-module--pricingCalculator--D5Y17 .style-module--disclaimerText--OKPyn{text-align:center;padding:1.5rem 0 0;font-size:1.2rem}.style-module--calculatorHead--1gP1e{position:relative}.style-module--calculatorHeadTitle--1S4o-{text-align:center}.style-module--calculatorHeadSummary--2M6\_A{text-align:center;width:700px;max-width:100%;margin:40px auto;font-weight:lighter}.style-module--cardsContainer--1b4zg{padding:5rem 0;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.style-module--cardsContainer--1b4zg{-ms-flex-direction:column;flex-direction:column}}.style-module--calculatorCard--Q2frv{border:7px solid hsla(0,0%,96.1%,.85);width:49%;padding:6rem}@media screen and (max-width:767px){.style-module--calculatorCard--Q2frv:first-of-type{margin-bottom:1.5rem}}.style-module--calculatorCard--Q2frv .style-module--calculatorCardContent--GnTWx{text-align:center;font-weight:700;font-size:1.8rem;line-height:2.3rem;color:#173361;height:12rem}.style-module--calculatorCard--Q2frv>div>div{text-align:center}@media screen and (max-width:767px){.style-module--calculatorCard--Q2frv{width:auto;padding:3rem}.style-module--calculatorCard--Q2frv .style-module--calculatorCardContent--GnTWx{font-size:1.6rem}}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN{margin:30px auto;padding:0;list-style:none;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;max-width:340px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN li{-ms-flex:1 1;flex:1 1}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN li:last-of-type img{height:38px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN img{width:auto}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--content--18XtX{margin:0 auto;max-width:620px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--content--18XtX p{margin-top:30px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cta--2wZ\_J:hover{background:#38cccd;border-color:#38cccd}.index-module--page--1UpMf .index-module--container--3d16M{padding:65px 15px 0;background-color:#fff}@media screen and (min-width:992px){.index-module--page--1UpMf .index-module--container--3d16M{padding:100px 150px 65px !important}}.index-module--page--1UpMf .index-module--calculatorContainer--2AKga{padding:0 15px;background-color:#fff}@media screen and (min-

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width:992px){.index-module--page--1UpMf .index-module--calculatorContainer--2AKga{padding:0
150px!important}}.index-module--page--1UpMf .index-module--item--22UIM{-ms-flex:0 1 300px!important;flex:0
1 300px!important;margin-bottom:50px}@media screen and (min-width:992px){.index-module--page--1UpMf
.index-module--item--22UIM{-ms-flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% -
20px)!important}}.index-module--page--1UpMf .index-module--item--22UIM>div:first-child{margin-
right:15px}.index-module--page--1UpMf .index-module--copy--1ftLS{font-weight:300;line-
height:1.86;color:#000;font-size:14px;text-align:center;margin-top:37px;margin-bottom:85px}.index-module--page-
-1UpMf .index-module--testimonial--28VhI{box-shadow:none}@media screen and (min-width:768px){.index-
module--page--1UpMf .index-module--testimonial--28VhI ul{overflow-x:hidden}}.index-module--page--1UpMf
.index-module--testimonialWhyConfluentWrapper--3LmbR{padding-top:30px}@media screen and (min-
width:768px){.index-module--page--1UpMf .index-module--testimonialWhyConfluentWrapper--
3LmbR{padding:183px 0 40px}}.index-module--page--1UpMf .index-module--featureSection--QSZ7m .index-
module--featureContainer--VEZYr>div>div{min-width:260px}.index-module--page--1UpMf .index-module--
pricingTierClassName--1woLd{-ms-flex-preferred-size:33.33%;flex-basis:33.33%}@media screen and (max-
width:991px){.index-module--page--1UpMf .index-module--pricingTierClassName--1woLd p,.index-module--
page--1UpMf .index-module--pricingTierClassName--1woLd strong{font-size:14px}}.index-module--page--1UpMf
.index-module--rowClassName--2VMt8>div{width:33.33%}.index-module--page--1UpMf .index-module--
rowClassName--2VMt8>div:last-of-type{display:none}.index-module--page--1UpMf .index-module--
confluentCloudCardSection--2hk5a{padding-top:0}@media screen and (min-width:768px){.index-module--page--
1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCardContent--
1Y6kG{display:-ms-flexbox;display:flex}}.index-module--page--1UpMf .index-module--
confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b{background-
color:#e6f5fb;padding:70px 35px;margin:10px}@media screen and (min-width:768px){.index-module--page--
1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b{-ms-
flex:1 1;flex:1 1;padding:100px 45px}}.index-module--page--1UpMf .index-module--confluentCloudCardSection--
2hk5a .index-module--confluentCloudCard--1w00b div{text-align:center}.index-module--page--1UpMf .index-
module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b a{margin-
top:30px}.index-module--page--1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--
confluentCloudCard--1w00b h3{color:#173361;width:80%;margin:auto}.tryfree-module--page--12u8F{overflow-
x:hidden}.tryfree-module--page--12u8F .tryfree-module--heroContent--EfkFT{-ms-flex-align:start;align-items:flex-
start}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS>div{position:relative}@media screen and (min-
width:992px){.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroContent--
EfkFT{position:relative;max-width:580px;width:60%}}@media screen and (min-width:1200px){.tryfree-module--
page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroImage--DARRe{right:90px;bottom:-
30px;position:absolute}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroImage--
DARRe img{max-width:900px}}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
content--2WOfs{margin:30px 0}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
cloudProviders--1YTxr{margin:15px 0}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS>div{-ms-flex-
align:start;align-items:flex-start}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
primaryCtaContainer--3Qrsn{margin-top:15px}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS
.tryfree-module--cloudProviders--1YTxr{padding:0;list-style:none;display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center;max-width:340px}@media screen and (max-width:991px){.tryfree-module--page--
12u8F .tryfree-module--hero--3X3tS .tryfree-module--cloudProviders--1YTxr{max-width:none;-ms-flex-
pack:center;justify-content:center}}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
cloudProviders--1YTxr li:not(:last-of-type){margin-right:40px}.tryfree-module--page--12u8F .tryfree-module--
hero--3X3tS .tryfree-module--cloudProviders--1YTxr li:last-of-type img{height:38px}.tryfree-module--page--
12u8F .tryfree-module--hero--3X3tS .tryfree-module--cloudProviders--1YTxr img{width:auto}.tryfree-module--
page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--cta--yHvzZ:hover{background:#38cccd;border-

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color:#38cccd}.tryfree-module--page--12u8F .tryfree-module--doMoreContent--h0A1I div { width:90% }.tryfree-module--page--12u8F #logos { margin-bottom:15px }.tryfree-module--page--12u8F #key-points { padding-top:0 } @media screen and (min-width:768px) { .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC { display:-ms-flexbox;display:flex } } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs { padding:70px 35px;margin:10px;border-radius:8px;border:7px solid hsla(0,0%,96.1%,.85) } @media screen and (min-width:768px) { .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs { -ms-flex:1 1;flex:1 1;padding:100px 45px } } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs div { text-align:center;-ms-flex-align:center;align-items:center } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs a { margin-top:30px } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs h3 { color:#173361;width:80%;margin:auto } .tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d { -ms-flex-preferred-size:33.33%;flex-basis:33.33% } @media screen and (max-width:991px) { .tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d p,.tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d strong { font-size:14px } } .tryfree-module--page--12u8F .tryfree-module--rowClassName--33R8i>div { width:33.33% } .tryfree-module--page--12u8F .tryfree-module--rowClassName--33R8i>div:last-of-type { display:none } .tryfree-module--page--12u8F .tryfree-module--estimateTitle--1dPZB { margin-bottom:0 } .tryfree-module--page--12u8F .tryfree-module--copy--2oYm3 { font-weight:300;line-height:1.86;color:#000;font-size:16px;text-align:center;width:800px;max-width:100%;margin:50px auto 100px } @media screen and (max-width:991px) { .tryfree-module--page--12u8F .tryfree-module--copy--2oYm3 { margin:50px auto } } .tryfree-module--page--12u8F .tryfree-module--contactBlurb--blmwN { text-align:center;margin-top:30px;margin-bottom:50px } .style-module--page--16hJw .style-module--heroSection--12Xfi>div { -ms-flex-pack:justify;justify-content:space-between } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi>div { -ms-flex-direction:column;flex-direction:column;padding-top:50px;padding-bottom:50px } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 { width:40%;margin-left:50px;max-width:510px } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 { width:90%;margin-left:0;margin-top:50px } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 img.style-module--clickable--15TDK { cursor:pointer } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 p { color:#fff;font-size:12px;font-weight:300;line-height:1.3;margin-top:5px } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 p { text-align:center } } @media screen and (min-width:992px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--leftColumn--2kQa6 { width:65% } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--leftColumn--2kQa6 ul { margin:50px 0 0;padding:0;list-style-position:inside } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv { background:hsla(0,0%,100%,.5) } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv>\* { text-align:center } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv p { margin:0 auto 30px } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv a { margin-bottom:10px } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv .style-module--ctaContainer--dYlaW { margin:auto 0 } .style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv .style-module--ctaContainer--dYlaW a+a { margin-left:10px } .style-module--page--16hJw .style-module--whySection--2bt8R .style-module--title--1OmKY { display:block } .style-module--page--16hJw .style-module--

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whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO{line-
height:1.63;padding:50px 90px;text-align:left}@media screen and (max-width:767px){.style-module--page--16hJw
.style-module--whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO{padding:50px
25px}}.style-module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x .style-
module--content--VbhfO ul{margin:20px 0;padding:0;list-style:none}.style-module--page--16hJw .style-module--
whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO ul
li{background:#fff;margin-bottom:10px;padding:20px;font-size:14px;font-weight:500;line-height:1.79}.style-
module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x .style-module--content-
-VbhfO ul li:last-child{margin-bottom:0}.style-module--page--16hJw .style-module--whySection--2bt8R .style-
module--accordion--12W8x .style-module--content--VbhfO ul ul{list-style-type:disc;list-style-
position:inside}.style-module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x
.style-module--content--VbhfO ul ul li{padding:0;font-weight:400}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 ul{-ms-flex-direction:column;flex-direction:column;width:90%;margin:0 auto;max-
width:800px}.style-module--page--16hJw .style-module--benefitSection--nY1h0 ul h4{color:#173361}.style-
module--page--16hJw .style-module--benefitSection--nY1h0 ul li{margin:0 0 50px}.style-module--page--16hJw
.style-module--benefitSection--nY1h0 ul li:last-child{margin-bottom:0}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW{margin:10px 0;display:-ms-
flexbox;display:flex;text-align:left}@media screen and (max-width:767px){.style-module--page--16hJw .style-
module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW{-ms-flex-
direction:column;flex-direction:column}}.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-
module--table--32JBF .style-module--row--FZfaW div{padding:20px 20px 30px;-ms-flex:1 1;flex:1 1}@media
screen and (max-width:767px){.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--
table--32JBF .style-module--row--FZfaW div{padding:20px}}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN{text-align:center}@media
screen and (max-width:767px){.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--
table--32JBF .style-module--header--3_VN{display:none}}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN div{background:none}.style-
module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3-
_VN div:not(.style-module--emptyCell---gCTw){border-radius:4px;margin:0
5px;padding:10px;color:#173361;font-size:18px;font-weight:700;line-height:23px}.style-module--page--16hJw
.style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN div:not(.style-
module--emptyCell---gCTw):last-child{margin-right:0}.style-module--page--16hJw .style-module--featureSection--
VVqNM .style-module--items--2m8yP{display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-
start}.style-module--page--16hJw .style-module--featureSection--VVqNM .style-module--items--
2m8yP>li{border:2px solid rgba(130,148,148,.25);border-radius:8px;margin:5px 0;width:100%;-ms-
flex:none!important;flex:none!important;padding:20px 15px}@media screen and (max-width:767px){.style-
module--page--16hJw .style-module--featureSection--VVqNM .style-module--items--
2m8yP>li{width:100%!important}}.style-module--page--16hJw .style-module--featureSection--VVqNM .style-
module--items--2m8yP>li h4{color:#000}.style-module--page--16hJw .style-module--featureSection--
VVqNM.style-module--col4--1kPzz .style-module--items--2m8yP>li{margin-right:10px;width:calc((100% -
30px)/4)}.style-module--page--16hJw .style-module--featureSection--VVqNM.style-module--col4--1kPzz .style-
module--items--2m8yP>li:nth-child(4n){margin-right:0}@media screen and (max-width:991px){.style-module--
page--16hJw .style-module--featureSection--VVqNM.style-module--col4--1kPzz .style-module--items--
2m8yP>li{width:calc((100% - 20px)/2)}}.style-module--page--16hJw .style-module--featureSection--
VVqNM.style-module--col3--yF8zI .style-module--items--2m8yP>li{margin-right:10px;width:calc((100% -
20px)/3)}.style-module--page--16hJw .style-module--featureSection--VVqNM.style-module--col3--yF8zI .style-
module--items--2m8yP>li:nth-child(3n){margin-right:0}.style-module--page--16hJw .style-module--
moreReleaseSection--eFAVF .style-module--content--VbhfO{color:#000;font-size:16px;font-weight:300;line-

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height:25px;letter-spacing:0;text-align:center}.style-module--page--16hJw .style-module--moreReleaseSection--
eFAVf .style-module--content--Vbhfo h3{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-
spacing:2px;text-transform:uppercase}.style-module--page--16hJw .style-module--moreReleaseSection--eFAVf
.style-module--content--Vbhfo p{margin-bottom:50px;max-width:720px}.style-module--purple--2FtjE .style-
module--benefitSection--nY1h0,.style-module--purple--2FtjE .style-module--trySection--
1GXCx{background:rgba(85,29,157,.03)}.style-module--purple--2FtjE .style-module--moreReleaseSection--
eFAVf,.style-module--purple--2FtjE .style-module--resourcesSection--
2OYkn{background:rgba(85,29,157,.1)}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0 .style-
module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(85,29,157,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#551d9d;font-
size:21px;font-weight:500;line-height:27px}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#551d9d;color:#fff}.style-module--green--2GuAI .style-module--benefitSection--nY1h0,.style-
module--green--2GuAI .style-module--trySection--1GXCx{background:rgba(21,158,134,.03)}.style-module--green--
2GuAI .style-module--moreReleaseSection--eFAVf,.style-module--green--2GuAI .style-module--
resourcesSection--2OYkn{background:rgba(21,158,134,.1)}.style-module--green--2GuAI .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(21,158,134,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--green--2GuAI .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#159e86;font-
size:21px;font-weight:500;line-height:27px}.style-module--green--2GuAI .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#159e86;color:#fff}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0,.style-
module--blue--3yMuA .style-module--trySection--1GXCx{background:rgba(13,172,204,.03)}.style-module--blue--
3yMuA .style-module--moreReleaseSection--eFAVf,.style-module--blue--3yMuA .style-module--resourcesSection--
2OYkn{background:rgba(13,172,204,.1)}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(13,172,204,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#0dacc; font-
size:21px;font-weight:500;line-height:27px}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#0dacc;color:#fff}.style-module--orange--mKAYd .style-module--benefitSection--
nY1h0,.style-module--orange--mKAYd .style-module--trySection--
1GXCx{background:rgba(227,125,98,.03)}.style-module--orange--mKAYd .style-module--moreReleaseSection--
eFAVf,.style-module--orange--mKAYd .style-module--resourcesSection--
2OYkn{background:rgba(227,125,98,.1)}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(227,125,98,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0 .style-module--table--32JBF
.style-module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#e37d62;font-
size:21px;font-weight:500;line-height:27px}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#e37d62;color:#fff}.style-module--grey--1eGst .style-module--benefitSection--nY1h0,.style-
module--grey--1eGst .style-module--trySection--1GXCx{background:rgba(88,120,140,.03)}.style-module--grey--
1eGst .style-module--moreReleaseSection--eFAVf,.style-module--grey--1eGst .style-module--resourcesSection--

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bar"></span><span class="icon-bar"></span></button><nav style="margin-top:0"><ul><li><a target="\_blank" rel="noopener noreferrer" href="#">Products</a><ul><li class=""><a href="/confluent-cloud">Confluent Cloud</a></li><li class="style-module--indent--I5Hp9"><a href="/confluent-cloud/support">Support</a></li><li class="style-module--indent--I5Hp9"><a target="\_blank" rel="noopener noreferrer" href="https://confluent.cloud/login">Log In</a></li><li class=""><a href="/product/confluent-platform">Confluent Platform</a></li><li class="style-module--indent--I5Hp9"><a href="/subscription">Subscription</a></li><li class=""><a href="/hub">Confluent Hub</a></li><li class=""><a href="/product/ksql">ksqlDB</a></li><li class=""><a href="/services">Professional Services</a></li><li class=""><a href="/training">Training</a></li></ul></li><li><a href="/resources">Learn</a><ul><li class=""><a href="/what-is-apache-kafka">What is Kafka?</a></li><li class=""><a href="/blog">Blog</a></li><li class=""><a href="/resources">Resources</a></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://events.confluent.io">Events</a></li><li class="style-module--indent--I5Hp9"><a href="/community">Meetups</a></li><li class="style-module--indent--I5Hp9"><a target="\_blank" rel="noopener noreferrer" href="https://kafka-summit.org">Kafka Summit</a></li><li class="style-module--indent--I5Hp9"><a href="/online-talks">Online Talks</a></li><li class=""><a href="/training">Training</a></li><li class=""><a href="/customers">Customers</a></li></ul></li><li><a target="\_blank" rel="noopener noreferrer" href="https://developer.confluent.io">Developers</a><ul><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://developer.confluent.io">Confluent Developer</a></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://kafka-tutorials.confluent.io">Kafka Tutorials</a></li></ul></li><li><a href="/about">About Us</a><ul><li class=""><a href="/about">Company</a></li><li class=""><a href="/partners">Partners</a></li><li class=""><a href="/in-the-news">News</a></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://events.confluent.io">Events</a></li><li class=""><a href="/careers">Careers</a></li><li class=""><a href="/contact">Contact</a></li><li class=""><a href="/trust-and-security">Trust and Security</a></li></ul></li><li><a target="\_blank" rel="noopener noreferrer" href="https://docs.confluent.io/current">Docs</a><ul></ul></li><li><a href="/download">Download</a><ul></ul></li></ul></nav></div><div class="style-module--searchContainer--M0vVi"><button type="button" class="style-module--button--K11\_E"><span class="sr-only">Search</span></button><div><form role="search"><input type="search" placeholder="Search Website" autoComplete="off" autoCorrect="off" autoCapitalize="off" name="s" value="" class="style-module--input--3P0z6 st-default-search-input" id="s"/></form></div></div><nav class="style-module--nav--1mswf"><ul><li class=""><a target="\_blank" rel="noopener noreferrer" href="#">Products</a><ul><li class=""><a href="/confluent-cloud">Confluent Cloud</a></li><li class="style-module--indent--I5Hp9"><a href="/confluent-cloud/support">Support</a></li><li class="style-module--indent--I5Hp9"><a target="\_blank" rel="noopener noreferrer" href="https://confluent.cloud/login">Log In</a></li><li class=""><a href="/product/confluent-platform">Confluent Platform</a></li><li class="style-module--indent--I5Hp9"><a href="/subscription">Subscription</a></li><li class=""><a href="/hub">Confluent Hub</a></li><li class=""><a href="/product/ksql">ksqlDB</a></li><li class=""><a href="/services">Professional Services</a></li><li class=""><a href="/training">Training</a></li></ul></li><li class=""><a href="/resources">Learn</a><ul><li class=""><a href="/what-is-apache-kafka">What is Kafka?</a></li><li class=""><a href="/blog">Blog</a></li><li class=""><a href="/resources">Resources</a></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://events.confluent.io">Events</a></li><li class="style-module--indent--I5Hp9"><a href="/community">Meetups</a></li><li class="style-module--indent--I5Hp9"><a target="\_blank" rel="noopener noreferrer" href="https://kafka-summit.org">Kafka Summit</a></li><li class="style-module--indent--I5Hp9"><a href="/online-talks">Online Talks</a></li><li class=""><a href="/training">Training</a></li><li class=""><a href="/customers">Customers</a></li></ul></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://developer.confluent.io">Developers</a><ul><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://developer.confluent.io">Confluent Developer</a></li><li class=""><a target="\_blank" rel="noopener noreferrer" href="https://kafka-tutorials.confluent.io">Kafka Tutorials</a></li></ul></li></ul></nav></div>

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3srjX" href="/cookies">More Information</a></div></div></div></div><div id="gatsby-announcer" style="position:absolute;top:0;width:1px;height:1px;padding:0;overflow:hidden;clip:rect(0, 0, 0, 0);white-space:nowrap;border:0" aria-live="assertive" aria-atomic="true"></div></div><script id="\_\_LOADABLE\_REQUIRED\_CHUNKS\_\_" type="application/json">[]</script><script id="\_\_LOADABLE\_REQUIRED\_CHUNKS\_\_ext" type="application/json">{"namedChunks":[]}</script><script>!function(){var t=window.driftt=window.drift=window.driftt||[];if(!t.init){if(t.invoked)return void(window.console&&console.error&&console.error("Drift snippet included twice."));t.invoked=!0,t.methods=["identify","config","track","reset","debug","show","ping","page","hide","off","on"],t.factory=function(e){return function(){var n=Array.prototype.slice.call(arguments);return n.unshift(e),t.push(n,t)},t.methods.forEach(function(e){t[e]=t.factory(e)}),t.load=function(t){var e=3e5\*Math.ceil(new Date/3e5),n=document.createElement("script");n.type="text/javascript",n.async=!0,n.crossorigin="anonymous",n.src="https://js.driftt.com/include/"+e+"/"+t+".js";var o=document.getElementsByTagName("script")[0];o.parentNode.insertBefore(n,o)}}();</script><script id="gatsby-script-loader">/\*! [CDATA[\* /window.pagePath="/confluent-community-license/";\*/]>\*/</script><script id="gatsby-chunk-mapping">/\*! [CDATA[\* /window.\_\_chunkMapping={"app":["/app-21ff557440d63499cf51.js"],"CfLandingPageSectionCard":["CfLandingPageSectionCarousel":["CfLandingPageSectionImage":["CfLandingPageSectionText":["component---src-pages-404-js":["/component---src-pages-404-js-a62280e90a18b6f6e2b5.js"],"component---src-pages-about-js":["/component---src-pages-about-js-c8d17b6a92066a3cf011.js"],"component---src-pages-advisory-terms-and-conditions-april-2016-js":["/component---src-pages-advisory-terms-and-conditions-april-2016-js-9f2649e0a6965353c694.js"],"component---src-pages-advisory-terms-and-conditions-js":["/component---src-pages-advisory-terms-and-conditions-js-d90256f69401ecab1336.js"],"component---src-pages-apache-engineering-guidelines-js":["/component---src-pages-apache-engineering-guidelines-js-2971c703e56f1919b90f.js"],"component---src-pages-apache-guidelines-js":["/component---src-pages-apache-guidelines-js-fbf9142d3642b9f40357.js"],"component---src-pages-archives-cloud-customer-dpa-pre-nov-2019-js":["/component---src-pages-archives-cloud-customer-dpa-pre-nov-2019-js-962398ef607e7cddee1a.js"],"component---src-pages-archives-cloud-enterprise-security-addendum-jan-2019-js":["/component---src-pages-archives-cloud-enterprise-security-addendum-jan-2019-js-7f71feaef64c5ac2cf6a.js"],"component---src-pages-archives-confluent-cloud-tos-sept-2019-js":["/component---src-pages-archives-confluent-cloud-tos-sept-2019-js-d503f0495afed1e843dc.js"],"component---src-pages-archives-confluent-privacy-statement-april-2018-js":["/component---src-pages-archives-confluent-privacy-statement-april-2018-js-6df4b452875a55984d26.js"],"component---src-pages-archives-confluent-privacy-statement-january-2020-js":["/component---src-pages-archives-confluent-privacy-statement-january-2020-js-7251ce04885fed56c2f2.js"],"component---src-pages-archives-confluent-privacy-statement-may-2018-js":["/component---src-pages-archives-confluent-privacy-statement-may-2018-js-1d2755944822c34b9f9c.js"],"component---src-pages-archives-confluent-privacy-statement-may-2019-js":["/component---src-pages-archives-confluent-privacy-statement-may-2019-js-a62a981977a64ffe77aa.js"],"component---src-pages-archives-confluent-privacy-statement-september-2018-js":["/component---src-pages-archives-confluent-privacy-statement-september-2018-js-013662f55d66480ee814.js"],"component---src-pages-archives-supplemental-services-terms-april-2019-js":["/component---src-pages-archives-supplemental-services-terms-april-2019-js-64bc41c8ee67cd7ece93.js"],"component---src-pages-candidate-privacy-js":["/component---src-pages-candidate-privacy-js-bdd6f6ca28de6ef3bb1a.js"],"component---src-pages-careers-js":["/component---src-pages-careers-js-f87bdfa28f4e58617c8e.js"],"component---src-pages-certification-js":["/component---src-pages-certification-js-1e112f6a5cc22a06083f.js"],"component---src-pages-cloud-customer-dpa-js":["/component---src-pages-cloud-customer-dpa-js-b647dd4b2f61826adfc5.js"],"component---src-pages-cloud-enterprise-security-addendum-archive-js":["/component---src-pages-cloud-enterprise-security-addendum-archive-js-

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## 1.190 rpm 4.14.3-23.el8

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when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author  
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
This is free software, and you are welcome to redistribute it  
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate  
parts of the General Public License. Of course, the commands you use may  
be called something other than `show w' and `show c'; they could even be  
mouse-clicks or menu items--whatever suits your program.

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school, if any, to sign a "copyright disclaimer" for the program, if  
necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program  
'Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
```

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consider it more useful to permit linking proprietary applications with the  
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Public License instead of this License.

## 1.192 cracklib 2.9.6 15.el8

## 1.192.1 Available under license :

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Version 2.1, February 1999

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!  
This package was debianized by Jean Pierre LeJacq <jplejacq@quoininc.com> on Wed, 25 Feb 1998. Martin Pitt <martin@piware.de> was the package's maintainer up to version 2.7.19-1. The current maintainer is Jan Dittberner <jandd@debian.org>.

It was downloaded from <http://sourceforge.net/projects/cracklib>

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Copyright (c) 2005-2009 Nathan Neulinger <nneul@umr.edu>,  
Copyright (c) 2008-2009 Jan Dittberner <jan@dittberner.info>

Modifications: Added cronjob, configuration file, and man pages.

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Copyright information:

CrackLib was originally licensed with a variant of the Artistic license. In the interests of wider acceptance and more modern licensing, it was switched with the original author's blessing to GPL v2.

This approval was carried out in email discussions in 2005, and has been reconfirmed as of 2007-10-01 with the following email from Alec Muffett. Cracklib's license was changed from the GPL to the LGPL after consensus of all previous developers in October 2008, effective with release 2.8.15 released on 2009-11-19. See the email discussion below for both license changes.

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EFFECTIVE OCT 2008, LICENSE IS BEING CHANGED TO LGPL-2.1 (though not reflected in released code until Nov 2009 - slow release cycle...)

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Discussion thread from mailing list archive, with approval from everyone actively involved or holding original licensing rights included.

[Cracklib-devel] cracklib license

From: Mike Frysinger <[vapier@ge...](mailto:vapier@ge...)> - 2007-10-02 01:16

Attachments: Message as HTML

looks like 2.8.11 is out and marked as "GPL-2" ... releasing libraries unde=  
r=20  
GPL-2 is not desirable at all ... this is why the LGPL-2.1 exists  
=2Dmike

Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:18

I understand that, and you're welcome to bring it up with Alec directly  
and see if he wants to relicense his code as LGPL... but at this point,  
it was enough to just get it consistent and documented as to what it was  
released under. This wasn't actually a license change, just a  
clarification of the licensing that was already in place.=20

-- Nathan

=20

-----  
Nathan Neulinger EMail: nneul@um...

University of Missouri - Rolla Phone: (573) 341-6679

UMR Information Technology Fax: (573) 341-4216

> -----Original Message-----

> From: cracklib-devel-bounces@li...

> [mailto:cracklib-devel-bounces@li...] On Behalf Of

> Mike Frysinger

> Sent: Monday, October 01, 2007 8:15 PM

> To: cracklib-devel@li...

> Subject: [Cracklib-devel] cracklib license

>=20

> looks like 2.8.11 is out and marked as "GPL-2" ... releasing

> libraries under

> GPL-2 is not desirable at all ... this is why the LGPL-2.1 exists

> -mike

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:33

Attachments: Message as HTML

On Monday 01 October 2007, Neulinger, Nathan wrote:

> I understand that, and you're welcome to bring it up with Alec directly  
> and see if he wants to relicense his code as LGPL... but at this point,  
> it was enough to just get it consistent and documented as to what it was  
> released under. This wasn't actually a license change, just a  
> clarification of the licensing that was already in place.

the original license (before moving to sourceforge -- aka, 2.7) was not=20

GPL-2 ... it was a modified artistic license ... i didnt notice the license=  
=20  
change until it was mentioned in the latest notes.

unlike the old license, GPL-2 prevents people from using cracklib unless th=  
eir=20  
applications are also GPL-2 which imo is just wrong. it isnt the place of =  
a=20  
library to dictact to application writes what license they should be using.=  
=20  
thus LGPL-2.1 enters to fill this void.  
=2Dmike

Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:46

Seems like the ideal thing here would be for you and the other distro  
maintainers to get together with Alec in a conversation and come to a  
decision as to what licensing scheme y'all want. I haven't really done  
much other than cleaning up the packaging and patches and a small bit of  
additional code, so whatever licensing y'all come up with is fine by me.

-- Nathan  
=20

-----  
Nathan Neulinger EMail: nneul@um...  
University of Missouri - Rolla Phone: (573) 341-6679  
UMR Information Technology Fax: (573) 341-4216

> -----Original Message-----

> From: cracklib-devel-bounces@li...  
> [mailto:cracklib-devel-bounces@li...] On Behalf Of  
> Mike Fry singer  
> Sent: Monday, October 01, 2007 8:33 PM  
> To: Neulinger, Nathan  
> Cc: cracklib-devel@li...; Alec Muffett  
> Subject: Re: [Cracklib-devel] cracklib license

>=20

> On Monday 01 October 2007, Neulinger, Nathan wrote:  
> > I understand that, and you're welcome to bring it up with Alec  
> directly  
> > and see if he wants to relicense his code as LGPL... but at this  
> point,  
> > it was enough to just get it consistent and documented as to what  
> it was  
> > released under. This wasn't actually a license change, just a  
> > clarification of the licensing that was already in place.  
>=20

> the original license (before moving to sourceforge -- aka, 2.7) was  
> not  
> GPL-2 ... it was a modified artistic license ... i didnt notice the  
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> change until it was mentioned in the latest notes.  
>=20  
> unlike the old license, GPL-2 prevents people from using cracklib  
> unless their  
> applications are also GPL-2 which imo is just wrong. it isnt the  
> place of a  
> library to dictact to application writes what license they should  
> be using.  
> thus LGPL-2.1 enters to fill this void.  
> -mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2007-10-02 08:57

> Seems like the ideal thing here would be for you and the other distro  
> maintainers to get together with Alec in a conversation and come to a  
> decision as to what licensing scheme y'all want. I haven't really done  
> much other than cleaning up the packaging and patches and a small  
> bit of  
> additional code, so whatever licensing y'all come up with is fine  
> by me.

I am sympathetic. Guys, what do you reckon?

What I am hearing so far is that LGPL makes sense, since it can be  
linked with any code, not just GPL...

-a

Re: [Cracklib-devel] cracklib license

From: Devin Reade <gdr@gn...> - 2007-10-02 15:04

I would like to see it under LGPL as well. I think it is in everyone's  
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If it's sinful, it's more fun.

Re: [Cracklib-devel] cracklib license

From: Nalin Dahyabhai <nalin@re...> - 2008-01-28 16:32

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In any case, I thank you both for working on sorting this out.

Cheers,

Nalin

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2008-10-05 21:27

Attachments: Message as HTML

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-mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2008-10-05 23:18

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> the change now ?

yes. go for it. thanks++

-a

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2008-10-25 22:34

Attachments: Message as HTML

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Nathan Neulinger is the only one who can actually make said change ...

-mike

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BELOW IS ORIGINAL LICENSING DISCUSSION RE CHANGING TO GPL from Artistic.  
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CrackLib was originally licensed with a variant of the Artistic license. In the interests of wider acceptance and more modern licensing, it was switched with the original author's blessing to GPL v2.

This approval was carried out in email discussions in 2005, and has been reconfirmed as of 2007-10-01 with the following email from Alec Muffett.

The below email references nneul@umr.edu address, as that is the address that was used at the time. For any future emails regarding this, please use nneul@neulinger.org.

-----  
From alecm@crypticide.com Mon Oct 1 12:26:03 2007  
Received: from umr-exproto2.cc.umr.edu ([131.151.0.192]) by UMR-CMAIL1.umr.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:03 -0500  
Received: from scansrv2.srv.mst.edu ([131.151.1.114]) by umr-exproto2.cc.umr.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:02 -0500  
Received: (qmail 8022 invoked from network); 1 Oct 2007 16:59:55 -0000  
Received: from smtp1.srv.mst.edu (131.151.1.43)  
by scanin-ipvs.cc.umr.edu with SMTP; 1 Oct 2007 16:59:55 -0000  
Received: from spunkymail-mx8.g.dreamhost.com (mx1.spunky.mail.dreamhost.com [208.97.132.47])  
by smtp1.srv.mst.edu (8.13.1/8.13.1) with ESMTP id 191Gxtp020623  
for <nneul@umr.edu>; Mon, 1 Oct 2007 11:59:55 -0500  
Received: from rutherford.zen.co.uk (rutherford.zen.co.uk [212.23.3.142])  
by spunkymail-mx8.g.dreamhost.com (Postfix) with ESMTP id 2C7734D311  
for <nneul@neulinger.org>; Mon, 1 Oct 2007 09:59:50 -0700 (PDT)  
Received: from [82.68.43.14] (helo=[192.168.1.3])  
by rutherford.zen.co.uk with esmtp (Exim 4.50)  
id 1IcOcX-0004Qt-6L  
for nneul@neulinger.org; Mon, 01 Oct 2007 16:59:49 +0000  
Mime-Version: 1.0 (Apple Message framework v752.2)  
In-Reply-To: <1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
References: <1190922867.3457.147.camel@localhost.localdomain>  
<EC90713277D2BE41B7110CCD74E235CEF44F38@UMR-CMAIL1.umr.edu>  
<1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
Content-Type: text/plain; charset=US-ASCII; delsp=yes; format=flowed  
Message-Id: <117A1264-F6DC-4E25-B0DD-56FBFE6E9F@crypticide.com>

Content-Transfer-Encoding: 7bit  
From: Alec Muffett <alecm@crypticide.com>  
Subject: Re: cracklib license  
Date: Mon, 1 Oct 2007 17:59:46 +0100  
To: Nathan Neulinger <nneul@neulinger.org>  
X-Mailer: Apple Mail (2.752.2)  
X-Originating-Rutherford-IP: [82.68.43.14]  
Return-Path: alecm@crypticide.com  
X-OriginalArrivalTime: 01 Oct 2007 17:26:03.0008 (UTC) FILETIME=[2420C000:01C80450]  
Status: RO  
Content-Length: 585  
Lines: 21

>  
> ----- Forwarded message -----  
> From: Neulinger, Nathan <nneul@umr.edu>  
> Date: Sep 27, 2007 2:58 PM  
> Subject: RE: cracklib license  
> To: alecm@crypto.dircon.co.uk  
>  
> Any chance you could write me a self-contained email stating clearly  
> that the license is being changed to GPL, so I could include that  
> email  
> in the repository and clean up the repository/tarballs? I have all the  
> original discussion, but something succinct and self contained  
> would be  
> ideal.

The license for my code in the Cracklib distribution is henceforth GPL.

Happy now? :-)

-a

-----  
EFFECTIVE OCT 2008, LICENSE IS BEING CHANGED TO LGPL-2.1 (though not reflected  
in released code until Nov 2009 - slow release cycle...)  
-----

Discussion thread from mailing list archive, with approval from everyone actively  
involved or holding original licensing rights included.

[Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:16

Attachments: Message as HTML

looks like 2.8.11 is out and marked as "GPL-2" ... releasing libraries unde=  
r=20

GPL-2 is not desirable at all ... this is why the LGPL-2.1 exists

=2Dmike

Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:18

I understand that, and you're welcome to bring it up with Alec directly and see if he wants to relicense his code as LGPL... but at this point, it was enough to just get it consistent and documented as to what it was released under. This wasn't actually a license change, just a clarification of the licensing that was already in place.=20

-- Nathan

=20

-----  
Nathan Neulinger EMail: nneul@um...

University of Missouri - Rolla Phone: (573) 341-6679

UMR Information Technology Fax: (573) 341-4216

> -----Original Message-----

> From: cracklib-devel-bounces@li...

> [mailto:cracklib-devel-bounces@li...] On Behalf Of

> Mike Frysinger

> Sent: Monday, October 01, 2007 8:15 PM

> To: cracklib-devel@li...

> Subject: [Cracklib-devel] cracklib license

>=20

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From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:33

Attachments: Message as HTML

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the original license (before moving to sourceforge -- aka, 2.7) was not=20

GPL-2 ... it was a modified artistic license ... i didnt notice the license=

=20

change until it was mentioned in the latest notes.

unlike the old license, GPL-2 prevents people from using cracklib unless the applications are also GPL-2 which imo is just wrong. it isn't the place of a library to dictate to application what license they should be using, thus LGPL-2.1 enters to fill this void.  
=2Dmike

Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:46

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> Sent: Monday, October 01, 2007 8:33 PM  
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Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2007-10-02 08:57

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Received: from umr-exproto2.cc.umr.edu ([131.151.0.192]) by UMR-CMAIL1.umr.edu with Microsoft SMTPSVC(6.0.3790.3959);  
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Mon, 1 Oct 2007 12:26:02 -0500  
Received: (qmail 8022 invoked from network); 1 Oct 2007 16:59:55 -0000  
Received: from smtp1.srv.mst.edu (131.151.1.43)  
by scanin-ipvs.cc.umr.edu with SMTP; 1 Oct 2007 16:59:55 -0000  
Received: from spunkymail-mx8.g.dreamhost.com (mx1.spunky.mail.dreamhost.com [208.97.132.47])  
by smtp1.srv.mst.edu (8.13.1/8.13.1) with ESMTP id 191Gxtpr020623  
for <nneul@umr.edu>; Mon, 1 Oct 2007 11:59:55 -0500  
Received: from rutherford.zen.co.uk (rutherford.zen.co.uk [212.23.3.142])  
by spunkymail-mx8.g.dreamhost.com (Postfix) with ESMTP id 2C7734D311  
for <nneul@neulinger.org>; Mon, 1 Oct 2007 09:59:50 -0700 (PDT)  
Received: from [82.68.43.14] (helo=[192.168.1.3])  
by rutherford.zen.co.uk with esmtp (Exim 4.50)  
id 1IcOcX-0004Qt-6L  
for nneul@neulinger.org; Mon, 01 Oct 2007 16:59:49 +0000  
Mime-Version: 1.0 (Apple Message framework v752.2)  
In-Reply-To: <1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
References: <1190922867.3457.147.camel@localhost.localdomain>  
<EC90713277D2BE41B7110CCD74E235CEF44F38@UMR-CMAIL1.umr.edu>  
<1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
Content-Type: text/plain; charset=US-ASCII; delsp=yes; format=flowed  
Message-Id: <117A1264-F6DC-4E25-B0DD-56FBFE6E9F@crypticide.com>  
Content-Transfer-Encoding: 7bit  
From: Alec Muffett <alecm@crypticide.com>

Subject: Re: cracklib license  
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To: Nathan Neulinger <nneul@neulinger.org>  
X-Mailer: Apple Mail (2.752.2)  
X-Originating-Rutherford-IP: [82.68.43.14]  
Return-Path: alecm@crypticide.com  
X-OriginalArrivalTime: 01 Oct 2007 17:26:03.0008 (UTC) FILETIME=[2420C000:01C80450]  
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> Subject: RE: cracklib license  
> To: alecm@crypto.dircon.co.uk  
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> ideal.

The license for my code in the Cracklib distribution is henceforth GPL.

Happy now? :-)

-a

## 1.193 almalinux-release 8.6-2.el8

### 1.193.1 Available under license :

AlmaLinux 8 EULA

AlmaLinux 8 comes with no guarantees or warranties of any sorts,  
either written or implied.

The Distribution is released as GPLv2. Individual packages in the  
distribution come with their own licences. A copy of the GPLv2 license  
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c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

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# 1.194 docker-cli 20.10.13

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proefs provides functions to retrieve system, kernel and process metrics from the pseudo-filesystem proc.

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## 1.195 idna 14.0.0

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## 1.196 libdb 5.3.28-42.el8\_4

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## 1.199 libcap 2.48-2.el8

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## 1.200 python-certifi 2018.01.18

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This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication. Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

## 1.201 libutempter 1.1.6 14.el8

### 1.201.1 Available under license :

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## 1.202 json-c 0.13.1-3.el8

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## 1.203 ima-evm-utils 1.3.2-12.el8

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## 1.206 libdnf 0.63.0-8.el8.alma

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## 1.207 nghttp2 1.33.0 3.e18\_2.1

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set yrange [0:]

set terminal pngcairo font 'Sans, 8' lw 1 size 1400,1024

set xtics rotate by -45

set style histogram errorbars gap 2 lw 1

set style fill solid border -1

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## 1.208 pcre 10.32 2.el8

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#### THE BASIC LIBRARY FUNCTIONS

-----

Written by: Philip Hazel

Email local part: ph10

Email domain: cam.ac.uk

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```
@end smallexample
```

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```

```
@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
@end smallexample
```

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with no Invariant Sections, no Front-Cover Texts, and no Back-Cover
Texts. A copy of the license is included in the section entitled ``GNU
Free Documentation License".
@end group
@end smallexample
```

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the ``with@dots{ }Texts." line with this:

```
@smallexample
@group
  with the Invariant Sections being @var{list their titles}, with
  the Front-Cover Texts being @var{list}, and with the Back-Cover Texts
  being @var{list}.
@end group
@end smallexample
```

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

```
@c Local Variables:
@c ispell-local-pdict: "ispell-dict"
@c End:
```

## 1.212 gettext 0.19.8.1 17.el8

### 1.212.1 Available under license :

```
The libasprintf package is under the LGPL, see file COPYING.LIB.
This subpackage is under the GPL, see file COPYING in the toplevel directory.
@c The GNU Lesser General Public License.
@center Version 2.1, February 1999
```

```
@c This file is intended to be included within another document,
@c hence no sectioning command or @node.
```

```
@display
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@enumerate 0

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@item

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@subheading END OF TERMS AND CONDITIONS

@page

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```
@smallexample
```

```
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`Frob' (a library for tweaking knobs) written by James Random Hacker.
```

```
@var{signature of Ty Coon}, 1 April 1990
```

```
Ty Coon, President of Vice
```

```
@end smallexample
```

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```
@c The GNU General Public License.
```

```
@center Version 2, June 1991
```

```
@c This file is intended to be included within another document,
```

```
@c hence no sectioning command or @node.
```

```
@display
```

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```
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Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

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@heading Appendix: How to Apply These Terms to Your New Programs

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@smallexample

@var{one line to give the program's name and a brief idea of what it does.}

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If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

@smallexample

Gnomovision version 69, Copyright (C) @var{year} @var{name of author}

Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.

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@end smallexample

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@example

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`Gnomovision' (which makes passes at compilers) written by James Hacker.

@var{signature of Ty Coon}, 1 April 1989

Ty Coon, President of Vice

@end example

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## 1.218 python-certifi 2022.06.15

### 1.218.1 Available under license :

This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication.

Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

## 1.219 mpdecimal 2.5.0

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## 1.224 libusb 1.0.23-4.el8

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## 1.225 zstd 1.4.4 1.el8

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# 1.230 npth 1.5 4.e18

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