



# Process and Memory Management Commands

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This chapter describes the Cisco IOS XR software commands used to manage processes and memory.

For more information about using the process and memory management commands to perform troubleshooting tasks, see *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide*.

- [clear context](#), on page 2
- [dumpcore](#), on page 3
- [exception coresize](#), on page 6
- [exception filepath](#), on page 8
- [exception pakmem](#), on page 12
- [exception sparse](#), on page 14
- [exception sprsize](#), on page 16
- [follow](#), on page 18
- [monitor threads](#), on page 25
- [process](#), on page 29
- [process core](#), on page 32
- [process mandatory](#), on page 34
- [show context](#), on page 36
- [show dll](#), on page 39
- [show exception](#), on page 42
- [show memory](#), on page 44
- [show memory compare](#), on page 47
- [show memory heap](#), on page 50
- [show processes](#), on page 54

# clear context

To clear core dump context information, use the **clear context** command in the appropriate mode.

```
clear context location {node-id | all}
```

|                           |   |   |
|---------------------------|---|---|
| <b>Syntax Description</b> | <b>location</b> { <i>node-id</i>   <b>all</b> } | (Optional) Clears core dump context information for a specified node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation. Use the <b>all</b> keyword to indicate all nodes. |
|---------------------------|---|---|

|                        |                               |
|------------------------|-------------------------------|
| <b>Command Default</b> | No default behavior or values |
|------------------------|-------------------------------|

|                      |                                  |
|----------------------|----------------------------------|
| <b>Command Modes</b> | Administration EXEC<br>EXEC mode |
|----------------------|----------------------------------|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | Release 3.7.2  | This command was introduced. |
|                        | Release 3.9.0  | No modification.             |

|                         |   |
|-------------------------|---|
| <b>Usage Guidelines</b> | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Use the **clear context** command to clear core dump context information. If you do not specify a node with the **location** *node-id* keyword and argument, this command clears core dump context information for all nodes.

Use the **show context** command to display core dump context information.

| <b>Task ID</b> | <b>Task ID</b> | <b>Operations</b> |
|----------------|----------------|-------------------|
|                | diag           | execute           |

The following example shows how to clear core dump context information:

```
RP/0/RSP0/CPU0:router# clear context
```

## Related Topics

[show context](#), on page 36

# dumpcore

To manually generate a core dump, use the **dumpcore** command in EXEC mode Admin EXEC mode.

**dumpcore** {**running** | **suspended**} *job-id* **location** *node-id*

| Syntax Description             |  |  |
|--------------------------------|--|--|
| <b>running</b>                 |  | Generates a core dump for a running process.   |
| <b>suspended</b>               |  | Suspends a process, generates a core dump for the process, and resumes the process.  |
| <i>job-id</i>                  |  | Process instance identifier.   |
| <b>location</b> <i>node-id</i> |  | Generates a core dump for a process running on the specified node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation. |

**Command Default** No default behavior or values

**Command Modes** Admin EXEC mode  
EXEC mode

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** When a process crashes on the Cisco IOS XR software, a core dump file of the event is written to a designated destination without bringing down the router. Upon receiving notification that a process has terminated abnormally, the Cisco IOS XR software then respawns the crashed process. Core dump files are used by Cisco Technical Support Center engineers and development engineers to debug the Cisco IOS XR software.

Core dumps can be generated manually for a process, even when a process has not crashed. Two modes exist to generate a core dump manually:

- **running** —Generates a core dump for a running process. This mode can be used to generate a core dump on a critical process (a process whose suspension could have a negative impact on the performance of the router) because the core dump file is generated independently, that is, the process continues to run as the core dump file is being generated.
- **suspended** —Suspends a process, generates a core dump for the process, and resumes the process. Whenever the process is suspended, this mode ensures data consistency in the core dump file.

Core dump files contain the following information about a crashed process:

- Register information
- Thread status information
- Process status information
- Selected memory segments

The following scenarios are applicable for creating full or sparse core dumps:

- Without the **exception sparse** configuration or exception sparse OFF, and default core size (4095 MB), a full core is created till the core size. Beyond this, only stack trace is collected.
- With non-default core size and without the **exception sparse** configuration, or exception sparse OFF , a full core is created until the core size limit is reached. Beyond the core size limit, only the stack trace is collected.
- With the exception sparse ON and default core size (4095 MB), a full core is created until the sparse size limit is reached, and a sparse core is created thereafter till the core size. Beyond this, only stack trace is collected.
- With non-default core size and with the exception sparse ON, a full core is created until the sparse size limit is reached. Beyond the sparse size limit, only the stack trace is collected.



**Note** By default, full core dumps are created irrespective of the **exception sparse** configuration. If there is not enough free shared memory available, then the core dump process fails.

| Task ID | Task ID | Operations     |
|---------|---------|----------------|
|         | diag    | read,<br>write |

The following example shows how to generate a core dump in suspended mode for the process instance 52:

```
RP/0/RSP0/CPU0:router# dumpcore suspended 52

RP/0/RP0/CPU0:Sep 22 01:40:26.982 : sysmgr[71]: process in stop/continue state 4104
RP/0/RP0/CPU0Sep 22 01:40:26.989 : dumper[54]: %DUMPER-4-CORE_INFO : Core for pid = 4104
(pkg/bin/devc-conaux) requested by pkg/bin/dumper_gen@node0_RP0_CPU0
RP/0/RP0/CPU0Sep 22 01:40:26.993 : dumper[54]: %DUMPER-6-SPARSE_CORE_DUMP :
Sparse core dump as configured dump sparse for all
RP/0/RP0/CPU0Sep 22 01:40:26.995 : dumper[54]: %DUMPER-7-DLL_INFO_HEAD : DLL path
Text addr. Text size Data addr. Data size Version
RP/0/RP0/CPU0Sep 22 01:40:26.996 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libplatform.dll 0xfc0d5000 0x0000a914 0xfc0e0000 0x00002000 0
RP/0/RP0/CPU0Sep 22 01:40:26.996 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libsysmgr.dll 0xfc0e2000 0x0000ab48 0xfc0c295c 0x00000368 0
RP/0/RP0/CPU0Sep 22 01:40:26.997 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libinfra.dll 0xfc0ed000 0x00032de0 0xfc120000 0x00000c90 0
RP/0/RP0/CPU0Sep 22 01:40:26.997 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libbios.dll 0xfc121000 0x0002c4bc 0xfc14e000 0x00002000 0
RP/0/RP0/CPU0Sep 22 01:40:26.997 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libc.dll 0xfc150000 0x00077ae0 0xfc1c8000 0x00002000 0
RP/0/RP0/CPU0Sep 22 01:40:26.998 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libsyslog.dll 0xfc1d2000 0x0000530c 0xfc120c90 0x00000308 0
RP/0/RP0/CPU0Sep 22 01:40:26.998 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libbackplane.dll 0xfc1d8000 0x0000134c 0xfc0c2e4c 0x000000a8 0
RP/0/RP0/CPU0Sep 22 01:40:26.999 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libnodeid.dll 0xfc1e5000 0x00009114 0xfc1e41a8 0x00000208 0
RP/0/RP0/CPU0Sep 22 01:40:26.999 : dumper[54]: %DUMPER-7-DLL_INFO :
```

```

/pkg/lib/libttyserver.dll 0xfc1f1000 0x0003dfcc 0xfc22f000 0x00002000 0
RP/0/RP0/CPU0Sep 22 01:40:27.000 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttytrace.dll 0xfc236000 0x00004024 0xfc1e44b8 0x000001c8 0
RP/0/RP0/CPU0Sep 22 01:40:27.000 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libdebug.dll 0xfc23b000 0x0000ef64 0xfc1e4680 0x00000550 0
RP/0/RP0/CPU0Sep 22 01:40:27.001 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/lib_procfs_util.dll 0xfc24a000 0x00004e2c 0xfc1e4bd0 0x000002a8 0
RP/0/RP0/CPU0Sep 22 01:40:27.001 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libsysdb.dll 0xfc24f000 0x000452e0 0xfc295000 0x00000758 0
RP/0/RP0/CPU0Sep 22 01:40:27.001 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libsysdbutils.dll 0xfc296000 0x0000ae08 0xfc295758 0x000003ec 0
RP/0/RP0/CPU0Sep 22 01:40:27.002 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/lib_tty_svr_error.dll 0xfc2a1000 0x0000172c 0xfc1e4e78 0x00000088 0
RP/0/RP0/CPU0Sep 22 01:40:27.002 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/lib_tty_error.dll 0xfc2a3000 0x00001610 0xfc1e4f00 0x00000088 0
RP/0/RP0/CPU0Sep 22 01:40:27.003 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libwd_evm.dll 0xfc2a5000 0x0000481c 0xfc295b44 0x00000188 0
RP/0/RP0/CPU0Sep 22 01:40:27.003 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttydb.dll 0xfc2aa000 0x000051dc 0xfc295ccc 0x00000188 0
RP/0/RP0/CPU0Sep 22 01:40:27.004 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttydb_error.dll 0xfc23a024 0x00000f0c 0xfc295e54 0x00000088 0
RP/0/RP0/CPU0Sep 22 01:40:27.004 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/librs232.dll 0xfc2b0000 0x00009c28 0xfc2ba000 0x00000470 0
RP/0/RP0/CPU0Sep 22 01:40:27.005 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/lib_rs232_error.dll 0xfc2bb000 0x00000f8c 0xfc295edc 0x00000088 0
RP/0/RP0/CPU0Sep 22 01:40:27.005 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libst16550.dll 0xfc2bc000 0x000008ed4 0xfc2ba470 0x00000430 0
RP/0/RP0/CPU0Sep 22 01:40:27.006 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libconaux.dll 0xfc2c5000 0x00001dc0 0xfc2ba8a0 0x000001a8 0
RP/0/RP0/CPU0Sep 22 01:40:27.006 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/lib_conaux_error.dll 0xfc1ee114 0x00000e78 0xfc295f64 0x00000088 0
RP/0/RP0/CPU0Sep 22 01:40:27.007 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttyutil.dll 0xfc2c7000 0x00003078 0xfc2baa48 0x00000168 0
RP/0/RP0/CPU0Sep 22 01:40:27.007 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libbag.dll 0xfc431000 0x0000ee98 0xfc40cc94 0x00000368 0
RP/0/RP0/CPU0Sep 22 01:40:27.008 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libchkpt.dll 0xfc474000 0x0002ecf8 0xfc4a3000 0x00000950 0
RP/0/RP0/CPU0Sep 22 01:40:27.008 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libsysdbbackend.dll 0xfc8ed000 0x0000997c 0xfc8d3aa8 0x0000028c 0
RP/0/RP0/CPU0Sep 22 01:40:27.008 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttygmtconnection.dll 0xfce85000 0x00004208 0xfce8a000 0x00000468
0
RP/0/RP0/CPU0Sep 22 01:40:27.009 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttygmt.dll 0xfcea4000 0x0000e944 0xfce8abf0 0x000003c8 0
RP/0/RP0/CPU0Sep 22 01:40:27.009 : dumper[54]: %DUMPER-7-DLL_INFO :
/pkg/lib/libttynmspc.dll 0xfcec7000 0x00004a70 0xfcec6644 0x000002c8 0
RP/0/RP0/CPU0Sep 22 01:40:28.396 : dumper[54]: %DUMPER-5-CORE_FILE_NAME :
Core for process pkg/bin/devc-conaux at harddisk:/coredump/devc-conaux.by.
dumper_gen.sparse.20040922-014027.node0_RP0_CPU0.ppc.Z
RP/0/RP0/CPU0Sep 22 01:40:32.309 : dumper[54]: %DUMPER-5-DUMP_SUCCESS : Core dump success

```

# exception coresize

Halts the creation of the core file beyond the configured core file size limit.

**exception coresize** *size*  
**no exception coresize**

## Syntax Description

**coresize** *size* Defines the maximum limit of the core file size beyond which the core file creation is halted and only the stack trace output is printed on the screen.  
 The core file size limit can range from 1 to 4095 MB.

## Command Default

This command has no default behavior.

## Command Modes

Global configuration

## Command History

| Release       | Modification                 |
|---------------|------------------------------|
| Release 5.1.1 | This command was introduced. |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The following scenarios are applicable for creating full or sparse core dumps:

- Without the **exception sparse** configuration or exception sparse OFF, and default core size (4095 MB), a full core is created till the core size. Beyond this, only stack trace is collected.
- With non-default core size and without the **exception sparse** configuration, or exception sparse OFF, a full core is created until the core size limit is reached. Beyond the core size limit, only the stack trace is collected.
- With the exception sparse ON and default core size (4095 MB), a full core is created until the sparse size limit is reached, and a sparse core is created thereafter till the core size. Beyond this, only stack trace is collected.
- With non-default core size and with the exception sparse ON, a full core is created until the sparse size limit is reached. Beyond the sparse size limit, only the stack trace is collected.



## Note

By default, full core dumps are created irrespective of the **exception sparse** configuration. If there is not enough free shared memory available, then the core dump process fails.

| Task ID | Task ID | Operations     |
|---------|---------|----------------|
|         | diag    | read,<br>write |

The following example shows how you can disable the creation of core dump files by specifying the limit for core file size.

```
RP/0/RSP0/CPU0:router(config)# exception coresize 1024  
RP/0/RSP0/CPU0:router(config)# commit
```

## exception filepath

To modify core dump settings, use the **exception filepath** command in the appropriate configuration mode. To remove the configuration, use the **no** form of this command.

**exception** [**choice preference**] [**compress {on | off}**] **filename filename lower-limit-higher-limit filepath filepath-name**

**no exception** [**choice preference**] [**compress {on | off}**] **filename filename lower-limit-higher-limit filepath filepath-name**

### Syntax Description

|   |  |
|---|--|
| <b>choice preference</b>                          | (Optional) Configures the order of preference for the destination of core dump files. Up to the three destinations can be defined. Valid values are 1 to 3.  |
| <b>compress {on   off}</b>                        | (Optional) Specifies whether or not the core dump file should be sent compressed. By default, core dump files are sent compressed. If you specify the <b>compress</b> keyword, you must specify one of the following required keywords: <ul style="list-style-type: none"> <li>• <b>on</b> —Compresses the core dump file before sending it.</li> <li>• <b>off</b> —Does not compress the core dump file before sending it.</li> </ul>   |
| <b>filename filename lower-limit-higher-limit</b> | (Optional) Specifies the filename to be appended to core dump files and the lower and higher limit range of core dump files to be sent to a specified destination before being recycled by the circular buffer. <p><b>filename filename lower-limit-higher-limit</b> See <a href="#">Table 1: Default Core Dump File Naming Convention Description, on page 10</a> for a description of the default core dump file naming convention.</p> <p>Valid <b>filename filename lower-limit-higher-limit</b> values for the <i>lower-limit</i> argument are 0 to 4. Valid values for the <i>higher-limit</i> argument are 5 to 64. A hyphen ( - ) must immediately follow the <i>lower-limit</i> argument.</p> <p><b>Note</b> To uniquely identify each core dump file, a value is appended to each core dump file, beginning with the lower limit value configured for the <i>lower-limit</i> argument and continuing until the higher limit value configured for the <i>higher-limit</i> argument has been reached. After the higher limit value has been reached, the Cisco IOS XR software begins to recycle the values appended to core dump files, beginning with the lower limit value.</p> |
| <b>filepath-name</b>                              | Local file system or network protocol, followed by the directory path. All local file systems are supported. The following network protocols are supported: TFTP and FTP.  |

### Command Default

If you do not specify the order of preference for the destination of core dump files using the **choice preference** keyword and argument, the default preference is the primary location or 1.

Core dump files are sent compressed.

The default file naming convention used for core dump files is described in [Table 1: Default Core Dump File Naming Convention Description, on page 10](#).



**Command Modes** Administration configuration  
Global configuration

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **exception filepath** command to modify core dump settings, such as the destination file path to store core dump files, file compression, and the filename appended to core dumps.

Up to three user-defined locations may be configured as the preferred destinations for core dump files:

- Primary location—The primary destination for core dump files. Enter the **choice** keyword and a value of **1** (that is, **choice 1**) for the *preference* argument to specify a destination as the primary location for core dump files.
- Secondary location—The secondary fallback choice for the destination for core dump files, if the primary location is unavailable (for example, if the hard disk is set as the primary location and the hard disk fails). Enter the **choice** keyword and a value of **2** (that is, **choice 2**) for the *preference* argument to specify a destination as the secondary location for core dump files.
- Tertiary location—The tertiary fallback choice as the destination for core dump files, if the primary and secondary locations fail. Enter the **choice** keyword and a value of 3 (that is, **choice 3**) for the *preference* argument to specify a destination as the tertiary location for core dump files.

When specifying a destination for a core dump file, you can specify an absolute file path on a local file system or on a network server. The following network protocols are supported: TFTP and FTP.



**Note** We recommend that you specify a location on the hard disk as the primary location.

In addition to the three preferred destinations that can be configured, Cisco IOS XR software provides three default fallback destinations for core dump files in the event that user-defined locations are unavailable.

The default fallback destinations are:

- harddisk:/dumper
- disk1:/dumper
- disk0:/dumper



**Note** If a default destination is a boot device, the core dump file is not sent to that destination.

We recommend that you configure at least one preferred destination for core dump files as a preventive measure if the default fallback paths are unavailable. Configuring at least one preferred destination also ensures that core dump files are archived because the default fallback destinations store only the first and last core dump files for a crashed process.



**Note** Cisco IOS XR software does not save a core file on a local storage device if the size of the core dump file creates a low-memory condition.

By default, Cisco IOS XR software assigns filenames to core dump files according to the following format:

*process* [.by. *requester* |.abort][.sparse]. *date-time* . *node* . *processor-type* [.Z]

For example:

```
packet.by.dumper_gen.20040921-024800.node0_RP0_CPU0.ppc.Z
```

[Table 1: Default Core Dump File Naming Convention Description, on page 10](#) describes the default core dump file naming convention.

**Table 1: Default Core Dump File Naming Convention Description**

| Field                          | Description   |
|--------------------------------|---|
| <i>process</i>                 | Name of the process that generated the core dump.   |
| .by. <i>requester</i>   .abort | If the core dump was generated because of a request by a process (requester), the core filename contains the string “.by. <i>requester</i> ” where the <i>requester</i> variable is the name or process ID (PID) of the process that requested the core dump. If the core dump was due to a self-generated abort call request, the core filename contains the string “.abort” instead of the name of the requester. |
| .sparse                        | If a sparse core dump was generated instead of a full core dump, “sparse” appears in the core dump filename.  |
| . <i>date-time</i>             | Date and time the dumper process was called by the process manager to generate the core dump. The <i>.date-time</i> time-stamp variable is expressed in the <i>yyyy.mm.dd-hh.mm.ss</i> format. Including the time stamp in the filename uniquely identifies the core dump filename.   |
| . <i>node</i>                  | Node ID, expressed in the <i>rack/slot/module</i> notation, where the process that generated the core dump was running.   |
| . <i>processor-type</i>        | Type of processor (mips or ppc).  |
| .Z                             | If the core dump was sent compressed, the filename contains the .Z suffix.  |

You can modify the default naming convention by specifying a filename to be appended to core dump files with the optional **filename** *filename* keyword and argument and by specifying a lower and higher limit ranges of values to be appended to core dump filenames with the *lower-limit* and *higher-limit* arguments, respectively. The filename that you specify for the *filename* argument is appended to the core dump file and the lower and higher limit ranges of core dump files to be sent to a specified destination before the filenames are recycled. Valid values for the *lower-limit* argument are 0 to 4. Valid values for the *higher-limit* argument

are 5 to 64. A hyphen (-) must immediately follow the *lower-limit* argument. In addition, to uniquely identify each core dump file, a value is appended to each core dump file, beginning with the lower-limit value specified with the *lower-limit* argument and continuing until the higher-limit value specified with the *higher-limit* argument has been reached. When the configured higher-limit value has been reached, Cisco IOS XR software begins to recycle the values appended to core dump files, beginning with the lower-limit value.

| Task ID | Task ID | Operations     |
|---------|---------|----------------|
|         | diag    | read,<br>write |

The following example shows how to configure the core dump setting for the primary user-defined preferred location. In this example, core files are configured to be sent uncompressed; the filename of core dump files is set to “core” (that is, all core filenames will be named core); the range value is set from 0 to 5 (that is, the values 0 to 5 are appended to the filename for the first five generated core dump files, respectively, before being recycled); and the destination is set to a directory on the hard disk.

```
RP/0/RP0/CPU0:router(config)# exception choice 1 compress off
filename core 0-5 filepath /harddisk:/corefile
```

#### Related Topics

- [exception pakmem](#), on page 12
- [exception sparse](#), on page 14
- [exception sprsize](#), on page 16
- [show exception](#), on page 42

# exception pakmem

To configure the collection of packet memory information in core dump files, use the **exception pakmem** command in administration configuration mode or in global configuration mode. To remove the configuration, use the **no** form of this command.

```
exception pakmem {on | off}
no exception pakmem {on | off}
```

|                           |   |
|---------------------------|---|
| <b>Syntax Description</b> | <b>on</b> Enables the collection of packet memory information in core dump files.   |
|                           | <b>off</b> Disables the collection of packet memory information in core dump files. |

|                        |   |
|------------------------|---|
| <b>Command Default</b> | Packet memory information is not included in core dump files. |
|------------------------|---|

|                      |  |
|----------------------|--|
| <b>Command Modes</b> | Administration configuration<br>Global configuration |
|----------------------|--|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | Release 3.7.2  | This command was introduced. |
|                        | Release 3.9.0  | No modification.             |

|                         |   |
|-------------------------|---|
| <b>Usage Guidelines</b> | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Use the **exception pakmem** command with the **on** keyword to configure the collection of packet memory information in core dump files. Cisco Technical Support Center engineers and development engineers use packet memory information to debug packet memory issues related to a process.



|                |  |
|----------------|--|
| <b>Caution</b> | Including packet memory information in core dump files significantly increases the amount of data generated in the core dump file, which may delay the restart time for the process. |
|----------------|--|

| <b>Task ID</b> | <b>Task ID</b> | <b>Operations</b> |
|----------------|----------------|-------------------|
|                | diag           | read,<br>write    |

The following example shows how to configure core dumps to include packet memory information:

```
RP/0/RSP0/CPU0:router (config) # exception pakmem on
```

**Related Topics**

- [exception filepath](#), on page 8
- [exception sparse](#), on page 14
- [exception sprsize](#), on page 16
- [show exception](#), on page 42

## exception sparse

To enable or disable sparse core dumps, use the **exception sparse** command in administration configuration mode or in global configuration mode. To remove the configuration, use the **no** form of this command.

```
exception sparse {on | off}
no exception sparse
```

|                           |  |
|---------------------------|--|
| <b>Syntax Description</b> | <b>on</b> Enables sparse core dumps.   |
|                           | <b>off</b> Disables sparse core dumps. |

|                        |                                 |
|------------------------|---------------------------------|
| <b>Command Default</b> | Sparse core dumps are disabled. |
|------------------------|---------------------------------|

|                      |  |
|----------------------|--|
| <b>Command Modes</b> | Administration configuration<br>Global configuration |
|----------------------|--|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | Release 3.7.2  | This command was introduced. |
|                        | Release 3.9.0  | No modification.             |

|                         |   |
|-------------------------|---|
| <b>Usage Guidelines</b> | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Use the **exception sparse** command to reduce the amount of data generated in the core dump file. Sparse core dumps reduce the amount of time required to generate the core dump file because only referenced data is generated in the core file (at the cost of lost information in the core file). Reducing the time required to generate core dump files corresponds to faster process restart times.



|             |   |
|-------------|---|
| <b>Note</b> | Use the <b>exception sparse off</b> command in administration configuration mode to get a complete coredump of the transient processes on the RP. |
|-------------|---|

Sparse core dumps contain the following information about crashed processes:

- Register information for all threads, and any memory pages referenced in these register values
- Stack information for all threads, and any memory pages referenced in these threads
- All memory pages referenced by a loaded dynamic loadable library (DLL) data section, if the final program counter falls in a DLL data section
- Any user-specified marker pages from the lib\_dumper\_marker DLL

The **exception sparse** command dumps memory pages based on trigger addresses found in the previously listed dump information, according to the following criteria:

- If the trigger address in the memory page is in the beginning 128 bytes of the memory page, the previous memory page in the continuous address region is dumped also.
- If the trigger address in the memory page is in the final 128 bytes of the memory page, the next memory page in the continuous address region is dumped also.
- In all other instances, only the memory page that includes the trigger address is dumped.

The following scenarios are applicable for creating full or sparse core dumps:

- Without the **exception sparse** configuration or exception sparse OFF, and default core size (4095 MB), a full core is created till the core size. Beyond this, only stack trace is collected.
- With non-default core size and without the **exception sparse** configuration, or exception sparse OFF , a full core is created until the core size limit is reached. Beyond the core size limit, only the stack trace is collected.
- With the exception sparse ON and default core size (4095 MB), a full core is created until the sparse size limit is reached, and a sparse core is created thereafter till the core size. Beyond this, only stack trace is collected.
- With non-default core size and with the exception sparse ON, a full core is created until the sparse size limit is reached. Beyond the sparse size limit, only the stack trace is collected.



**Note** By default, full core dumps are created irrespective of the **exception sparse** configuration. If there is not enough free shared memory available, then the core dump process fails.

| Task ID | Task ID | Operations     |
|---------|---------|----------------|
|         | diag    | read,<br>write |

The following example shows how to enable sparse core dumps:

```
RP/0/RSP0/CPU0:router(config)# exception sparse on
```

#### Related Topics

- [exception filepath](#), on page 8
- [exception pakmem](#), on page 12
- [exception sprsize](#), on page 16
- [show exception](#), on page 42

## exception sprsize

To specify the maximum file size for core dumps, use the **exception sprsize** command in administration configuration mode or in global configuration mode. To remove the configuration, use the **no** form of this command.

**exception sprsize** *megabytes*  
**no exception sprsize**

|                           |  |
|---------------------------|--|
| <b>Syntax Description</b> | <i>megabytes</i> Size in megabytes (MB). |
|---------------------------|--|

|                        |                        |
|------------------------|------------------------|
| <b>Command Default</b> | <i>megabytes</i> : 192 |
|------------------------|------------------------|

|                      |  |
|----------------------|--|
| <b>Command Modes</b> | Administration configuration<br>Global configuration |
|----------------------|--|

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | Release 3.7.2  | This command was introduced. |
|                        | Release 3.9.0  | No modification.             |

|                         |   |
|-------------------------|---|
| <b>Usage Guidelines</b> | To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. |
|-------------------------|---|

Use the **exception sprsize** command to specify the maximum file size for core dumps. The maximum file size configured for the *megabytes* argument is used with the configuration set for the [exception sparse, on page 14](#) command to determine whether or not to generate a sparse core dump file. If sparse core dumps are disabled and a core dump file is predicted to exceed the default value (192 MB) uncompressed or the value specified for the *megabytes* argument uncompressed, a sparse core dump file is generated. If sparse core dumps are enabled, a sparse core dump file is generated, regardless of the size of the core dump file.

The following scenarios are applicable for creating full or sparse core dumps:

- Without the **exception sparse** configuration or exception sparse OFF, and default core size (4095 MB), a full core is created till the core size. Beyond this, only stack trace is collected.
- With non-default core size and without the **exception sparse** configuration, or exception sparse OFF , a full core is created until the core size limit is reached. Beyond the core size limit, only the stack trace is collected.
- With the exception sparse ON and default core size (4095 MB), a full core is created until the sparse size limit is reached, and a sparse core is created thereafter till the core size. Beyond this, only stack trace is collected.
- With non-default core size and with the exception sparse ON, a full core is created until the sparse size limit is reached. Beyond the sparse size limit, only the stack trace is collected.





**Note** By default, full core dumps are created irrespective of the **exception sparse** configuration. If there is not enough free shared memory available, then the core dump process fails.

---

**Task ID**

---

**Task ID**    **Operations**

---

|      |                |
|------|----------------|
| diag | read,<br>write |
|------|----------------|

---

The following example shows how to set the file size of sparse core dumps to 300 MB:

```
RP/0/RSP0/CPU0:router(config)# exception sprsize 300
```

**Related Topics**

[exception sparse](#), on page 14

# follow

To unobtrusively debug a live process or a live thread in a process, use the **follow** command in EXEC modeAdmin EXEC mode.

**follow** {**job** *job-id* | **process** *pid* | **location** *node-id*} [**all**] [**blocked**] [**debug** *level*] [**delay** *seconds*] [**dump** *address size*] [**iteration** *count*] [**priority** *level*] [**stackonly**] [**thread** *tid*] [**verbose**]

## Syntax Description

|                                 |   |
|---------------------------------|---|
| <b>job</b> <i>job-id</i>        | Follows a process by job ID.  |
| <b>process</b> <i>pid</i>       | Follows the process with the process ID (PID) specified for the <i>pid</i> argument.  |
| <b>location</b> <i>node-id</i>  | Follows the target process on the designated node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation.                |
| <b>all</b>                      | (Optional) Follows all threads.   |
| <b>blocked</b>                  | (Optional) Follows the chain of thread IDs (TIDs) or PIDs that are blocking the target process.   |
| <b>debug</b> <i>level</i>       | (Optional) Sets the debug level for the following operation. Valid values for the <i>level</i> argument are 0 to 10.                                |
| <b>delay</b> <i>seconds</i>     | (Optional) Sets the delay interval between each iteration. Valid values for the <i>seconds</i> argument are 0 to 255 seconds.                       |
| <b>dump</b> <i>address size</i> | (Optional) Dumps the memory segment starting with the specified memory address and size specified for the <i>address</i> and <i>size</i> arguments. |
| <b>iteration</b> <i>count</i>   | (Optional) Specifies the number of times to display information. Valid values for the <i>count</i> argument are 0 to 255 iterations.                |
| <b>priority</b> <i>level</i>    | (Optional) Sets the priority level for the following operation. Valid values for the <i>level</i> argument are 1 to 63.                             |
| <b>stackonly</b>                | (Optional) Displays only stack trace information.   |
| <b>thread</b> <i>tid</i>        | (Optional) Follows the TID of a process or job ID specified for the <i>tid</i> argument.  |
| <b>verbose</b>                  | (Optional) Displays register and status information pertaining to the target process.   |

## Command Default

Entering the **follow** command without any optional keywords or arguments performs the operation for five iterations from the local node with a delay of 5 seconds between each iteration. The output includes information about all live threads. This command uses the default scheduling priority from where the command is being run.

## Command Modes

EXEC mode  
Admin EXEC mode

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

### Usage Guidelines

Use this command to unintrusively debug a live process or a live thread in a process. This command is particularly useful for debugging deadlock and livelock conditions, for examining the contents of a memory location or a variable in a process to determine the cause of a corruption issue, or in investigating issues where a thread is stuck spinning in a loop. A livelock condition is one that occurs when two or more processes continually change their state in response to changes in the other processes.

The following actions can be specified with this command:

- Follow all live threads of a given process or a given thread of a process and print stack trace in a format similar to core dump output.
- Follow a process in a loop for a given number of iterations.
- Set a delay between two iterations while invoking the command.
- Set the priority at which this process should run while this command is being run.
- Dump memory from a given virtual memory location for a given size.
- Display register values and status information of the target process.

Take a snapshot of the execution path of a thread asynchronously to investigate performance-related issues by specifying a high number of iterations with a zero delay.

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | read       |

The following example shows how to use the **follow** command to debug the process associated with job ID 257 for one iteration:

```
RP/0/RSP0/CPU0:router# follow job 257 iteration 1
```

```
Attaching to process pid = 28703 (pkg/bin/packet)
No tid specified, following all threads
```

```
DLL Loaded by this process
```

```
-----
```

| DLL path                     | Text addr. | Text size  | Data addr. | Data size  | Version |
|------------------------------|------------|------------|------------|------------|---------|
| /pkg/lib/libovl.dll          | 0xfc0c9000 | 0x0000c398 | 0xfc0c31f0 | 0x0000076c | 0       |
| /pkg/lib/libplatform.dll     | 0xfc0d6000 | 0x0000aa88 | 0xfc0e1000 | 0x00002000 | 0       |
| /pkg/lib/libsysmgr.dll       | 0xfc0e3000 | 0x0000aeac | 0xfc0c395c | 0x00000388 | 0       |
| /pkg/lib/libinfra.dll        | 0xfc0ee000 | 0x000332ec | 0xfc122000 | 0x00000c70 | 0       |
| /pkg/lib/libios.dll          | 0xfc123000 | 0x0002c4bc | 0xfc150000 | 0x00002000 | 0       |
| /pkg/lib/libc.dll            | 0xfc152000 | 0x00077ae0 | 0xfc1ca000 | 0x00002000 | 0       |
| /pkg/lib/libsyslog.dll       | 0xfc1d4000 | 0x0000530c | 0xfc122c70 | 0x00000308 | 0       |
| /pkg/lib/libbackplane.dll    | 0xfc1da000 | 0x0000134c | 0xfc0c3e6c | 0x000000a8 | 0       |
| /pkg/lib/libnodeid.dll       | 0xfc1e7000 | 0x000091fc | 0xfc1e61a8 | 0x00000208 | 0       |
| /pkg/lib/libdebug.dll        | 0xfc23e000 | 0x0000ef64 | 0xfc1e6680 | 0x00000550 | 0       |
| /pkg/lib/lib_procfs_util.dll | 0xfc24d000 | 0x00004e2c | 0xfc1e6bd0 | 0x000002a8 | 0       |

```

/pkg/lib/libsysdb.dll      0xfc252000 0x00046224 0xfc299000 0x0000079c      0
/pkg/lib/libsysdbutils.dll 0xfc29a000 0x0000ae04 0xfc29979c 0x000003ec      0
/pkg/lib/libwd_evm.dll     0xfc2a9000 0x0000481c 0xfc299b88 0x00000188      0
/pkg/lib/lib_mutex_monitor.dll 0xfc35e000 0x00002414 0xfc340850 0x00000128      0
/pkg/lib/libchkpt.dll      0xfc477000 0x00002ee04 0xfc474388 0x00000950      0
/pkg/lib/libpacket_common.dll 0xfc617000 0x000130f0 0xfc6056a0 0x000007b0      0

```

```
Iteration 1 of 1
```

```
-----
```

```
Current process = "pkg/bin/packet", PID = 28703 TID = 1
```

```

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]
trace_back: #5 0x48204410 [<N/A>]

```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/packet", PID = 28703 TID = 2
```

```

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]
trace_back: #5 0xfc48d848 [chk_evm_thread]

```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/packet", PID = 28703 TID = 3
```

```

trace_back: #0 0xfc17d54c [SignalWaitinfo]
trace_back: #1 0xfc161c64 [sigwaitinfo]
trace_back: #2 0xfc10302c [event_signal_thread]

```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/packet", PID = 28703 TID = 4
```

```

trace_back: #0 0xfc1106c4 [MsgReceivePulse]
trace_back: #1 0xfc0fc604 [msg_receive_async]
trace_back: #2 0xfc0ffa70 [event_dispatch]
trace_back: #3 0xfc0ffc5c [event_block_async]
trace_back: #4 0xfc35e36c [receive_events]

```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/packet", PID = 28703 TID = 5
```

```

trace_back: #0 0xfc17d564 [SignalWaitinfo_r]
trace_back: #1 0xfc161c28 [sigwait]
trace_back: #2 0x48203928 [<N/A>]

```

```
ENDOFSTACKTRACE
```

The following example shows how to use the **follow** command to debug TID 5 of the process associated with job ID 257 for one iteration:

```
RP/0/RSP0/CPU0:router# follow job 257 iteration 1 thread 5
```

Attaching to process pid = 28703 (pkg/bin/packet)

DLL Loaded by this process

-----

| DLL path                       | Text addr. | Text size  | Data addr. | Data size  | Version |
|--------------------------------|------------|------------|------------|------------|---------|
| /pkg/lib/libovl.dll            | 0xfc0c9000 | 0x0000c398 | 0xfc0c31f0 | 0x0000076c | 0       |
| /pkg/lib/libplatform.dll       | 0xfc0d6000 | 0x0000aa88 | 0xfc0e1000 | 0x00002000 | 0       |
| /pkg/lib/libsysmgr.dll         | 0xfc0e3000 | 0x0000aeac | 0xfc0c395c | 0x00000388 | 0       |
| /pkg/lib/libinfra.dll          | 0xfc0ee000 | 0x000332ec | 0xfc122000 | 0x00000c70 | 0       |
| /pkg/lib/libios.dll            | 0xfc123000 | 0x0002c4bc | 0xfc150000 | 0x00002000 | 0       |
| /pkg/lib/libc.dll              | 0xfc152000 | 0x00077ae0 | 0xfc1ca000 | 0x00002000 | 0       |
| /pkg/lib/libsyslog.dll         | 0xfc1d4000 | 0x0000530c | 0xfc122c70 | 0x00000308 | 0       |
| /pkg/lib/libbackplane.dll      | 0xfc1da000 | 0x0000134c | 0xfc0c3e6c | 0x000000a8 | 0       |
| /pkg/lib/libnodeid.dll         | 0xfc1e7000 | 0x000091fc | 0xfc1e61a8 | 0x00000208 | 0       |
| /pkg/lib/libdebug.dll          | 0xfc23e000 | 0x0000ef64 | 0xfc1e6680 | 0x00000550 | 0       |
| /pkg/lib/lib_procfs_util.dll   | 0xfc24d000 | 0x00004e2c | 0xfc1e6bd0 | 0x000002a8 | 0       |
| /pkg/lib/libsysdb.dll          | 0xfc252000 | 0x00046224 | 0xfc299000 | 0x0000079c | 0       |
| /pkg/lib/libsysdbutils.dll     | 0xfc29a000 | 0x0000ae04 | 0xfc29979c | 0x000003ec | 0       |
| /pkg/lib/libwd_evm.dll         | 0xfc2a9000 | 0x0000481c | 0xfc299b88 | 0x00000188 | 0       |
| /pkg/lib/lib_mutex_monitor.dll | 0xfc35e000 | 0x00002414 | 0xfc340850 | 0x00000128 | 0       |
| /pkg/lib/libchkpt.dll          | 0xfc477000 | 0x0002ee04 | 0xfc474388 | 0x00000950 | 0       |
| /pkg/lib/libpacket_common.dll  | 0xfc617000 | 0x000130f0 | 0xfc6056a0 | 0x000007b0 | 0       |

Iteration 1 of 1

-----

Current process = "pkg/bin/packet", PID = 28703 TID = 5

trace\_back: #0 0xfc17d564 [SignalWaitinfo\_r]

trace\_back: #1 0xfc161c28 [sigwait]

trace\_back: #2 0x48203928 [<N/A>]

ENDOFSTACKTRACE

The following example shows how to use the **follow** command to debug the chain of threads blocking thread 2 associated with the process assigned PID 139406:

```
RP/0/RSP0/CPU0:router# follow process 139406 blocked iteration 1 thread 2
```

Attaching to process pid = 139406 (pkg/bin/lpts\_fm)

DLL Loaded by this process

-----

| DLL path                     | Text addr. | Text size  | Data addr. | Data size  | Version |
|------------------------------|------------|------------|------------|------------|---------|
| /pkg/lib/libplatform.dll     | 0xfc0d6000 | 0x0000aa88 | 0xfc0e1000 | 0x00002000 | 0       |
| /pkg/lib/libsysmgr.dll       | 0xfc0e3000 | 0x0000aeac | 0xfc0c395c | 0x00000388 | 0       |
| /pkg/lib/libinfra.dll        | 0xfc0ee000 | 0x000332ec | 0xfc122000 | 0x00000c70 | 0       |
| /pkg/lib/libios.dll          | 0xfc123000 | 0x0002c4bc | 0xfc150000 | 0x00002000 | 0       |
| /pkg/lib/libc.dll            | 0xfc152000 | 0x00077ae0 | 0xfc1ca000 | 0x00002000 | 0       |
| /pkg/lib/libltrace.dll       | 0xfc1cc000 | 0x00007f5c | 0xfc0c3ce4 | 0x00000188 | 0       |
| /pkg/lib/libsyslog.dll       | 0xfc1d4000 | 0x0000530c | 0xfc122c70 | 0x00000308 | 0       |
| /pkg/lib/libbackplane.dll    | 0xfc1da000 | 0x0000134c | 0xfc0c3e6c | 0x000000a8 | 0       |
| /pkg/lib/libnodeid.dll       | 0xfc1e7000 | 0x000091fc | 0xfc1e61a8 | 0x00000208 | 0       |
| /pkg/lib/libdebug.dll        | 0xfc23e000 | 0x0000ef64 | 0xfc1e6680 | 0x00000550 | 0       |
| /pkg/lib/lib_procfs_util.dll | 0xfc24d000 | 0x00004e2c | 0xfc1e6bd0 | 0x000002a8 | 0       |
| /pkg/lib/libsysdb.dll        | 0xfc252000 | 0x00046224 | 0xfc299000 | 0x0000079c | 0       |
| /pkg/lib/libsysdbutils.dll   | 0xfc29a000 | 0x0000ae04 | 0xfc29979c | 0x000003ec | 0       |
| /pkg/lib/libwd_evm.dll       | 0xfc2a9000 | 0x0000481c | 0xfc299b88 | 0x00000188 | 0       |
| /pkg/lib/libbag.dll          | 0xfc40c000 | 0x0000ee98 | 0xfc41b000 | 0x00000368 | 0       |

follow

```

/pkg/lib/libwd_notif.dll 0xfc4f8000 0x00005000 0xfc4fd000 0x00001000 0
/pkg/lib/libifmgr.dll 0xfc665000 0x00029780 0xfc68f000 0x00003000 0
/pkg/lib/libnetio_client.dll 0xfca6a000 0x000065c8 0xfca2c4f8 0x000001b4 0
/pkg/lib/libpa_client.dll 0xfcec5000 0x00006e9c 0xfcecc000 0x00003000 0
/pkg/lib/libltimes.dll 0xfcecf000 0x00002964 0xfcdc4f20 0x000000a8 0

```

Iteration 1 of 1

Current process = "pkg/bin/lpts\_fm", PID = 139406 TID = 2

```

trace_back: #0 0xfc110744 [MsgSendv]
trace_back: #1 0xfc0fbf04 [msg_sendv]
trace_back: #2 0xfc0fbbd8 [msg_send]
trace_back: #3 0xfcec7580 [pa_fm_close]
trace_back: #4 0xfcec78b0 [pa_fm_process_0]

```

ENDOFSTACKTRACE

REPLY (node node0\_RP1\_CPU0, pid 57433)

No specific TID, following all threads of 57433 (pkg/bin/lpts\_pa)

DLL Loaded by this process

| DLL path                            | Text addr. | Text size  | Data addr. | Data size  | Version |
|-------------------------------------|------------|------------|------------|------------|---------|
| /pkg/lib/libplatform.dll            | 0xfc0d6000 | 0x0000aa88 | 0xfc0e1000 | 0x00002000 | 0       |
| /pkg/lib/libsysmgr.dll              | 0xfc0e3000 | 0x0000aeac | 0xfc0c395c | 0x00000388 | 0       |
| /pkg/lib/libinfra.dll               | 0xfc0ee000 | 0x000332ec | 0xfc122000 | 0x00000c70 | 0       |
| /pkg/lib/libbios.dll                | 0xfc123000 | 0x0002c4bc | 0xfc150000 | 0x00002000 | 0       |
| /pkg/lib/libc.dll                   | 0xfc152000 | 0x00077ae0 | 0xfc1ca000 | 0x00002000 | 0       |
| /pkg/lib/libltrace.dll              | 0xfc1cc000 | 0x00007f5c | 0xfc0c3ce4 | 0x00000188 | 0       |
| /pkg/lib/libsyslog.dll              | 0xfc1d4000 | 0x0000530c | 0xfc122c70 | 0x00000308 | 0       |
| /pkg/lib/libbackplane.dll           | 0xfc1da000 | 0x0000134c | 0xfc0c3e6c | 0x000000a8 | 0       |
| /pkg/lib/libnodeid.dll              | 0xfc1e7000 | 0x000091fc | 0xfc1e61a8 | 0x00000208 | 0       |
| /pkg/lib/libdebug.dll               | 0xfc23e000 | 0x0000ef64 | 0xfc1e6680 | 0x00000550 | 0       |
| /pkg/lib/lib_procfs_util.dll        | 0xfc24d000 | 0x00004e2c | 0xfc1e6bd0 | 0x000002a8 | 0       |
| /pkg/lib/libsysdb.dll               | 0xfc252000 | 0x00046224 | 0xfc299000 | 0x0000079c | 0       |
| /pkg/lib/libsysdbutils.dll          | 0xfc29a000 | 0x0000ae04 | 0xfc29979c | 0x000003ec | 0       |
| /pkg/lib/libwd_evm.dll              | 0xfc2a9000 | 0x0000481c | 0xfc299b88 | 0x00000188 | 0       |
| /pkg/lib/lrdlib.dll                 | 0xfc2f6000 | 0x0000a900 | 0xfc2f551c | 0x00000610 | 0       |
| /pkg/lib/liblrfuncs.dll             | 0xfc30e000 | 0x00001998 | 0xfc2ebd80 | 0x000001ec | 0       |
| /pkg/lib/libdscapi.dll              | 0xfc310000 | 0x0000457c | 0xfc2f5b2c | 0x0000035c | 0       |
| /pkg/lib/liblrdshared.dll           | 0xfc315000 | 0x00005fec | 0xfc31b000 | 0x00002000 | 0       |
| /pkg/lib/libbag.dll                 | 0xfc40c000 | 0x0000ee98 | 0xfc41b000 | 0x00000368 | 0       |
| /pkg/lib/libchkpt.dll               | 0xfc477000 | 0x0002ee04 | 0xfc474388 | 0x00000950 | 0       |
| /pkg/lib/libwd_notif.dll            | 0xfc4f8000 | 0x00005000 | 0xfc4fd000 | 0x00001000 | 0       |
| /pkg/lib/libltrace_sdt.dll          | 0xfc65c000 | 0x000034fc | 0xfc65b73c | 0x00000568 | 0       |
| /pkg/lib/libfabhandle.dll           | 0xfc6be000 | 0x00003354 | 0xfc65bca4 | 0x00000248 | 0       |
| /pkg/lib/libfsdb_ltrace_util_rt.dll | 0xfc6ea000 | 0x00001b74 | 0xfc605e50 | 0x00000108 | 0       |
| /pkg/lib/libbcdl.dll                | 0xfc6fb000 | 0x0000f220 | 0xfc6fa6e8 | 0x0000045c | 0       |
| /pkg/lib/liblpts_pa_fgid.dll        | 0xfc8d7000 | 0x00006640 | 0xfc7acd5c | 0x00000208 | 0       |
| /pkg/lib/libfgid.dll                | 0xfc910000 | 0x0001529c | 0xfc926000 | 0x00002000 | 0       |
| /pkg/lib/libltimes.dll              | 0xfcecf000 | 0x00002964 | 0xfcdc4f20 | 0x000000a8 | 0       |

Current process = "pkg/bin/lpts\_pa", PID = 57433 TID = 1

```

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]

```

```

trace_back: #5 0x48201904 [<N/A>]
trace_back: #6 0x48201e3c [<N/A>]

ENDOFSTACKTRACE

Current process = "pkg/bin/lpts_pa", PID = 57433 TID = 2

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]
trace_back: #5 0x4821e978 [<N/A>]

ENDOFSTACKTRACE

Current process = "pkg/bin/lpts_pa", PID = 57433 TID = 3

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]
trace_back: #5 0x482064c4 [<N/A>]

ENDOFSTACKTRACE

```

The following example shows how to use the **follow** command to debug the chain of threads blocking thread 2 associated with the process assigned PID 139406:

```

RP/0/RSP0/CPU0:router# follow process 139406 blocked iteration 1 stackonly thread 2

Attaching to process pid = 139406 (pkg/bin/lpts_fm)

Iteration 1 of 1
-----

Current process = "pkg/bin/lpts_fm", PID = 139406 TID = 2

trace_back: #0 0xfc110744 [MsgSendv]
trace_back: #1 0xfc0fbf04 [msg_sendv]
trace_back: #2 0xfc0fbbd8 [msg_send]
trace_back: #3 0xfccec7580 [pa_fm_close]
trace_back: #4 0xfccec78b0 [pa_fm_process_0]

ENDOFSTACKTRACE

REPLY (node node0_RP1_CPU0, pid 57433)

No specific TID, following all threads of 57433 (pkg/bin/lpts_pa)
-----

Current process = "pkg/bin/lpts_pa", PID = 57433 TID = 1

trace_back: #0 0xfc1106dc [MsgReceivev]
trace_back: #1 0xfc0fc840 [msg_receivev]
trace_back: #2 0xfc0fc64c [msg_receive]
trace_back: #3 0xfc0ffa70 [event_dispatch]
trace_back: #4 0xfc0ffc2c [event_block]
trace_back: #5 0x48201904 [<N/A>]
trace_back: #6 0x48201e3c [<N/A>]

```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/lpts_pa", PID = 57433 TID = 2
```

```
trace_back: #0 0xfc1106dc [MsgReceivev]  
trace_back: #1 0xfc0fc840 [msg_receivev]  
trace_back: #2 0xfc0fc64c [msg_receive]  
trace_back: #3 0xfc0ffa70 [event_dispatch]  
trace_back: #4 0xfc0ffc2c [event_block]  
trace_back: #5 0x4821e978 [<N/A>]
```

```
ENDOFSTACKTRACE
```

```
Current process = "pkg/bin/lpts_pa", PID = 57433 TID = 3
```

```
trace_back: #0 0xfc1106dc [MsgReceivev]  
trace_back: #1 0xfc0fc840 [msg_receivev]  
trace_back: #2 0xfc0fc64c [msg_receive]  
trace_back: #3 0xfc0ffa70 [event_dispatch]  
trace_back: #4 0xfc0ffc2c [event_block]  
trace_back: #5 0x482064c4 [<N/A>]
```

```
ENDOFSTACKTRACE
```

### Related Topics

[monitor threads](#), on page 25

[show processes](#), on page 54



# monitor threads

To display auto-updating statistics on threads in a full-screen mode, use the **monitor threads** command in administration EXEC mode or in EXEC mode.

**monitor threads** [**dumbtty**] [**iteration** *number*] [**location** *node-id*]

## Syntax Description

|                                |   |
|--------------------------------|---|
| <b>dumbtty</b>                 | (Optional) Displays the output of the command as if on a dumb terminal (the screen is not refreshed).   |
| <b>iteration</b> <i>number</i> | (Optional) Number of times the statistics display is to be updated, in the range from 0 to 4294967295.  |
| <b>location</b> <i>node-id</i> | (Optional) Displays the output from the command from the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation. |

## Command Default

When all keywords are omitted, the **monitor threads** command displays the first ten threads for the local node, sorted in descending order by the time used. The display is cleared and updated every 5 seconds until you quit the command.

## Command Modes

EXEC, Admin EXEC

## Command History

| Release       | Modification                 |
|---------------|------------------------------|
| Release 3.7.2 | This command was introduced. |
| Release 3.9.0 | No modification.             |

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **monitor threads** command to show the top ten threads based on CPU usage. The display refreshes every 10 seconds.

- To change the parameters displayed by the **monitor threads** command, enter one of the key commands described in [Table 2: Interactive Display Commands for the monitor threads Command, on page 26](#).
- To terminate the display and return to the system prompt, enter the **q** key.
- To list the interactive commands, type **?** during the display.

[Table 2: Interactive Display Commands for the monitor threads Command, on page 26](#) describes the available interactive display commands.

Table 2: Interactive Display Commands for the monitor threads Command

| Command | Description  |
|---------|--|
| ?       | Displays the available interactive commands.                       |
| d       | Changes the delay interval between updates.                        |
| k       | Kills a process.   |
| l       | Refreshes the screen.  |
| n       | Changes the number of threads to be displayed.                     |
| q       | Quits the interactive display and returns the prompt to EXEC mode. |

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | execute    |

The following example shows sample output from the **monitor threads** command:

```
RP/0/RSP0/CPU0:router# monitor threads

195 processes; 628 threads;
CPU states: 98.2% idle, 0.9% user, 0.7% kernel
Memory: 2048M total, 1576M avail, page size 4K

  JID   TID  LAST_CPU  PRI  STATE  HH:MM:SS      CPU  COMMAND
    1    12    1         10  Rcv    0:00:09      0.42%  procnto-600-smp-cisco-instr
    1    25    1         10  Run    0:00:30      0.36%  procnto-600-smp-cisco-instr
  342    1    1         19  Rcv    0:00:07      0.20%  wdsysmon
    52    5    0         21  Rcv    0:00:03      0.15%  devc-conaux
    52    3    1         18  Rcv    0:00:02      0.07%  devc-conaux
532670  1    0         10  Rply   0:00:00      0.07%  top
    293   6    0         55  Rcv    0:00:06      0.03%  shelfmgr
    55    8    0         10  Rcv    0:00:02      0.03%  eth_server
   315   3    0         10  Rcv    0:00:11      0.03%  sysdb_svr_local
    55    7    0         55  Rcv    0:00:11      0.02%  eth_server
```

The following example shows sample output from the **monitor threads** command using the optional **location** keyword:

```
RP/0/RSP0/CPU0:router# monitor threads location 0/RP0/CPU0

Computing times...195 processes; 628 threads;
CPU states: 95.1% idle, 2.7% user, 2.0% kernel
Memory: 2048M total, 1576M avail, page size 4K

  JID   TID  LAST_CPU  PRI  STATE  HH:MM:SS      CPU  COMMAND
    1    25    0         10  Run    0:00:32      2.08%  procnto-600-smp-cisco-instr
  265    5    0         10  SigW   0:00:09      0.89%  packet
  279    1    1         10  Rcv    0:00:00      0.65%  qsm
557246  1    0         10  Rply   0:00:00      0.51%  top
   293   5    1         55  Rcv    0:00:01      0.07%  shelfmgr
   180  13    1         10  Rcv    0:00:02      0.07%  gsp
   315   3    0         10  Rcv    0:00:12      0.07%  sysdb_svr_local
```

```

55      7      1      55 Rcv      0:00:12      0.04% eth_server
180     1      0      10 Rcv      0:00:01      0.04% gsp
298     9      0      10 Rcv      0:00:01      0.04% snmpd

```

[Table 3: monitor threads Field Descriptions, on page 27](#) describes the significant fields shown in the display.

**Table 3: monitor threads Field Descriptions**

| Field    | Description                               |
|----------|---|
| JID      | Job ID.                                   |
| TIDS     | Thread ID.                                |
| LAST_CPU | Number of open channels.                  |
| PRI      | Priority level of the thread.             |
| STATE    | State of the thread.                      |
| HH:MM:SS | Run time of process since last restart.   |
| CPU      | Percentage of CPU used by process thread. |
| COMMAND  | Process name.                             |

### Using Interactive Commands

When the **n** or **d** interactive command is used, the **monitor threads** command prompts for a number appropriate to the specific interactive command. The following example shows sample output from the **monitor threads** command using the interactive **n** command after the first display cycle to change the number of threads:

```

RP/0/RSP0/CPU0:router# monitor threads

Computing times... 87 processes; 249 threads;
CPU states: 84.8% idle, 4.2% user, 10.9% kernel
Memory: 256M total, 175M avail, page size 4K

   JID   TID  PRI  STATE  HH:MM:SS      CPU  COMMAND
   ---   ---  ---  ---    ---:---:---   ---  ---
    1     6   10  Run    0:00:10     10.92% kernel
553049   1   10  Rply   0:00:00      4.20% top
    58    3   10  Rcv    0:00:24      0.00% sysdsbvr
    1     3   10  Rcv    0:00:21      0.00% kernel
    69    1   10  Rcv    0:00:20      0.00% wdsysmon
    1     5   10  Rcv    0:00:20      0.00% kernel
   159    2   10  Rcv    0:00:05      0.00% qnet
   160    1   10  Rcv    0:00:05      0.00% netio
   157    1   10  NSlp   0:00:04      0.00% envmon_periodic
   160    9   10  Intr   0:00:04      0.00% netio

n

Enter number of threads to display: 3
Please enter a number between 5 and 40
Enter number of threads to display: 8

```

```
87 processes; 249 threads;
CPU states: 95.3% idle, 2.9% user, 1.7% kernel
Memory: 256M total, 175M avail, page size 4K
```

| JID    | TID | PRI | STATE | HH:MM:SS | CPU   | COMMAND         |
|--------|-----|-----|-------|----------|-------|-----------------|
| 1      | 6   | 10  | Run   | 0:00:11  | 1.76% | kernel          |
| 69     | 1   | 10  | Rcv   | 0:00:20  | 1.11% | wdsysmon        |
| 58     | 3   | 10  | Rcv   | 0:00:24  | 0.40% | sysdsbr         |
| 157    | 1   | 10  | NSlp  | 0:00:04  | 0.23% | envmon_periodic |
| 159    | 19  | 10  | Rcv   | 0:00:02  | 0.20% | qnet            |
| 553049 | 1   | 10  | Rply  | 0:00:00  | 0.20% | top             |
| 159    | 12  | 10  | Rcv   | 0:00:03  | 0.13% | qnet            |
| 160    | 1   | 10  | Rcv   | 0:00:05  | 0.10% | netio           |

When a number outside the acceptable range is entered, the acceptable range is displayed:

```
Please enter a number between 5 and 40
Enter number of threads to display:
```

### Related Topics

[monitor processes](#)

# process

To start, terminate, or restart a process, use the **process** command in admin EXEC mode.

**process** {**crash** | **restart** | **shutdown** | **start**} {*executable-name**job-id*} **location** {*node-id* | **all**}

## Syntax Description

|   |  |
|---|--|
| <b>crash</b>                                    | Crashes a process.   |
| <b>restart</b>                                  | Restarts a process.  |
| <b>shutdown</b>                                 | Stops a process. The process is not restarted (even if considered “mandatory ◆?”).   |
| <b>start</b>                                    | Starts a process.  |
| <i>executable-name</i>                          | Executable name of the process to be started, terminated, or restarted. Supplying an executable name for the <i>executable-name</i> argument performs the action for all the simultaneously running instances of the process, if applicable. |
| <i>job-id</i>                                   | Job ID of the process instance to be started, terminated, or restarted. Supplying a job ID for the <i>job-id</i> argument performs the action for only the process instance associated with the job ID.                                      |
| <b>location</b> { <i>node-id</i>   <b>all</b> } | Starts, terminates, or restarts a process on the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation. The <b>all</b> keyword specifies all nodes.  |

## Command Default

None

## Command Modes

Admin EXEC

## Command History

| Release       | Modification                 |
|---------------|------------------------------|
| Release 3.7.2 | This command was introduced. |
| Release 3.9.0 | No modification.             |

## Usage Guidelines

Under normal circumstances, processes are started and restarted automatically by the operating system as required. If a process crashes, it is automatically restarted.

Use this command to manually start, stop, or restart individual processes.



### Caution

Manually stopping or restarting a process can seriously impact the operation of a router. Use these commands only under the direction of a Cisco Technical Support representative.

**process shutdown**

The **process shutdown** command shuts down (terminates) the specified process and copies associated with the specified process. The process is not restarted, even if considered “mandatory.” Use the **show processes** command to display a list of executable processes running on the system.

**Caution**

Stopping a process can result in an RP switchover, system failure or both. This command is intended for use only under the direct supervision of a Cisco Technical Support representative.

**process restart**

The **process restart** command restarts a process, such as a process that is not functioning optimally.

**process start**

The **process start** command starts a process that is not currently running, such as a process that was terminated using the **process kill** command. If multiple copies are on the system, all instances of the process are started simultaneously.

**Task ID**

| Task ID | Task    | Operations |
|---------|---------|------------|
|         | root-lr | execute    |

The following example shows how to restart a process. In this example, the IS-IS process is restarted:

```
RP/0/RSP0/CPU0:router# process restart isis

RP/0/RSP0/CPU0:router#RP/0/RSP0/CPU0:Mar 30 15:24:41 : isis[343]: %ISIS-6-INFO_ST
RTUP_START : Cisco NSF controlled start beginning
RP/0/RSP0/CPU0:router#RP/0/RSP0/CPU0:Mar 30 15:24:52 : isis[352]: %ISIS-6-INFO_ST
RTUP_FINISH : Cold controlled start completed
```

The following example shows how to terminate a process. In this example, the IS-IS process is stopped:

```
RP/0/RSP0/CPU0:router# process shutdown isis
RP/0/RSP0/CPU0:router#
```

The following example shows how to start a process. In this example, the IS-IS process is started:

```
RP/0/RSP0/CPU0:router# process start isis

RP/0/RSP0/CPU0:router#RP/0/RSP0/CPU0:Mar 30 15:27:19 : isis[227]:
%ISIS-6-INFO_STARTUP_START : Cold controlled start beginning
RP/0/RSP0/CPU0:Mar 30 15:27:31 : isis[352]: %ISIS-6-INFO_STARTUP_FINISH :
Cold controlled start completed
```

This example shows how to restart a process:

**Related Topics**

[process mandatory](#), on page 34

[show processes](#), on page 54

## process core

To modify the core dump options for a process, use the **process core** command in administration EXEC mode.

**process** {*executable-name**job-id*} **core** {**context** | **copy** | **fallback** | **iomem** | **mainmem** | **off** | **sharedmem** | **sparse** | **sync** | **text**} [**maxcore** *value*] **location** *node-id*

### Syntax Description

|                                |   |
|--------------------------------|---|
| <i>executable-name</i>         | Executable name of the process for which you want to change core dump options. Specifying a value for the <i>executable-name</i> argument changes the core dump option for multiple instances of a running process. |
| <i>job-id</i>                  | Job ID associated with the process instance. Specifying a <i>job-id</i> value changes the core dump option for only a single instance of a running process.   |
| <b>context</b>                 | Dumps only context information for a process.   |
| <b>copy</b>                    | Copies a core dump locally before performing the core dump.   |
| <b>fallback</b>                | Sets the core dump options to use the fallback options (if needed).   |
| <b>iomem</b>                   | Dumps the I/O memory of a process.  |
| <b>mainmem</b>                 | Dumps the main memory of a process.   |
| <b>off</b>                     | Indicates that a core dump is not taken on the termination of the specified process.  |
| <b>sharedmem</b>               | Dumps the shared memory of a process.   |
| <b>sparse</b>                  | Enables sparse core dumps of a process.   |
| <b>sync</b>                    | Enables only synchronous core dumping.  |
| <b>text</b>                    | Dumps the text of a process.  |
| <b>maxcore</b> <i>value</i>    | (Optional) Specifies the maximum number of core dumps allowed for the specified process on its creation.  |
| <b>location</b> <i>node-id</i> | Sets the core dump options for a process on a designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.  |

### Command Default

By default, processes are configured to dump shared memory, text area, stack, data section, and heap information.

### Command Modes

Administration EXEC

### Command History

| Release       | Modification                 |
|---------------|------------------------------|
| Release 3.7.2 | This command was introduced. |
| Release 3.9.0 | No modification.             |



**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The modular architecture of Cisco IOS XR software allows core dumps for individual processes. By default, processes are configured to dump shared memory, text area, stack, data section, and heap information.

Specifying an executable name for the *executable-name job-id* argument changes the core dump option for all instances of the process. Specifying a job ID for the value changes the core dump option for a single instance of a running process.

**Task ID**

| Task ID | Operations |
|---------|------------|
| root-lr | execute    |

The following example shows how to enable the collection of shared memory of a process:

```
RP/0/RSP0/CPU0:router# process ospf core sharedmem
```

The following example shows how to turn off core dumping for a process:

```
RP/0/RSP0/CPU0:router# process media_ether_config_di core off
```

**Related Topics**

[show processes](#), on page 54

## process mandatory

To set the mandatory reboot options for a process, use the **process mandatory** command in the appropriate mode.

### process mandatory

**process mandatory** {**on** | **off**} {*executable-name**job-id*} **location** *node-id*

### process mandatory reboot

**process mandatory reboot** {**enable** | **disable**}

### process mandatory toggle

**process mandatory toggle** {*executable-name**job-id*} **location** *node-id*

### Syntax Description

|  |   |
|--|---|
| <b>on</b>  | Turns on mandatory process attribute.   |
| <b>off</b>                                       | Turns off the mandatory process attribute. The process is not considered mandatory.   |
| <b>reboot</b> { <b>enable</b>   <b>disable</b> } | Enables or disables the reboot action when a mandatory process fails.   |
| <b>toggle</b>                                    | Toggles a mandatory process attribute.  |
| <i>executable-name</i>                           | Executable name of the process to be terminated. Specifying an executable name for the <i>executable-name</i> argument terminates the process and all the simultaneously running copies, if applicable. |
| <i>job-id</i>                                    | Job ID associated with the process to be terminated. Terminates only the process associated with the job ID.  |
| <b>location</b> <i>node-id</i>                   | Sets the mandatory settings for a process on a designated node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation.   |

### Command Default

No default behavior or values

### Command Modes

Administration EXEC

EXEC

### Command History

| Release       | Modification                 |
|---------------|------------------------------|
| Release 3.7.2 | This command was introduced. |
| Release 3.9.0 | No modification.             |

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If a process unexpectedly goes down, the following action occurs based on whether the process is considered mandatory.

- If the process is mandatory and the process cannot be restarted, the node automatically reboots.
- If the process is not mandatory and cannot be restarted, it stays down and the node does not reboot.

| Task ID | Task ID | Operations |
|---------|---------|------------|
|         | root-lr | execute    |

The following example shows how to turn on a mandatory attribute. In this example, the mandatory attribute is turned on for the `media_ether_config_di` process.

```
RP/0/RSP0/CPU0:router# process mandatory on media_ether_config_di
```

The following example shows how to turn the reboot option on. In this example, the router is set to reboot the node if a mandatory process goes down and cannot be restarted.

```
RP/0/RSP0/CPU0:router# process mandatory reboot enable
```

```
RP/0/RSP00/CPU0:Mar 19 19:28:10 : sysmgr[71]: %SYSMGR-4-MANDATORY_REBOOT_ENABLE :
mandatory reboot option enabled by request
```

The following example shows how to turn off the reboot option. In this example, the router is set *not* to reboot the node if a mandatory process goes down and cannot be restarted. In this case, the mandatory process is restarted, but the node is not rebooted.

```
RP/0/RSP0/CPU0:router# process mandatory reboot disable
```

```
RP/0/RSP00/CPU0:Mar 19 19:31:20 : sysmgr[71]: %SYSMGR-4-MANDATORY_REBOOT_OVERRIDE
: mandatory reboot option overridden by request
```

### Related Topics

[show processes](#), on page 54

## show context

To display core dump context information, use the **show context** command in administration EXEC mode or in EXEC mode.

**show context** [*coredump-occurrence* | **clear**] [**location** {*node-id* | **all**}]

| Syntax Description                              |   |
|---|---|
| <i>coredump-occurrence</i>                      | (Optional) Core dump context information to be displayed based on the occurrence of the core dump. Valid values are 1 to 10.  |
| <b>clear</b>                                    | (Optional) Clears the current context information.  |
| <b>location</b> { <i>node-id</i>   <b>all</b> } | Displays core dump information that occurred on the designated node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation. The <b>all</b> keyword specifies to display information for all nodes. |

**Command Default** If no *coredump-occurrence* value is specified, core dump context information for all core dumps is displayed.

**Command Modes** EXEC, Administration EXEC

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show context** command to display core dump context information. This command displays context information for the last ten core dumps. Cisco Technical Support Center engineers and development engineers use this command for post-analysis in the debugging of processes.

Use the [clear context, on page 2](#) command to clear core dump context information.

| Task ID | Task ID | Operations |
|---------|---------|------------|
|         | diag    | read       |

The following example shows sample output from the **show context** command:

```
RP/0/RSP0/CPU0:router# show context

Crashed pid = 20502 (pkg/bin/mbi-hello)
Crash time: Thu Mar 25, 2004: 19:34:14
```

```
Core for process at disk0:/mbi-hello.20040325-193414.node0_RP0_CPU0
```

```
Stack Trace
#0 0xfc117c9c
#1 0xfc104348
#2 0xfc104154
#3 0xfc107578
#4 0xfc107734
#5 0x482009e4

Registers info
      r0      r1      r2      r3
R0  0000000e 481ffa80 4820c0b8 00000003
      r4      r5      r6      r7
R4  481ffb18 00000001 481ffa88 48200434
      r8      r9      r10     r11
R8  00000000 00000001 00000000 fc17ac58
      r12     r13     r14     r15
R12 481ffb08 4820c080 481ffc10 00000001
      r16     r17     r18     r19
R16 481ffc24 481ffc2c 481ffc44 00000000
      r20     r21     r22     r23
R20 00398020 00000000 481ffb6c 4820a484
      r24     r25     r26     r27
R24 00000000 00000001 4820efe0 481ffb88
      r28     r29     r30     r31
R28 00000001 481ffb18 4820ef08 00000001
      cnt     lr      msr     pc
R32 fc168d58 fc104348 0000d932 fc117c9c
      cnd     xer
R36 24000022 00000004
```

```
DLL Info
DLL path      Text addr.  Text size  Data addr.  Data size  Version
/pkg/lib/libinfra.dll 0xfc0f6000 0x00032698 0xfc0f5268 0x00000cb4
```

The following example shows sample output from the **show context** command. The output displays information about a core dump from a process that has not crashed.

```
RP/0/RSP0/CPU0:router# show context

node:      node0_RP0_CPU0
-----

Crashed pid = 28703 (pkg/bin/packet)
Crash time: Tue Sep 21, 2004: 02:48:00
Core for process at harddisk:/packet.by.dumper_gen.20040921-024800.node0_RP0_CPU0.ppc.Z
```

[Table 4: show context Field Descriptions, on page 37](#) describes the significant fields shown in the display.

**Table 4: show context Field Descriptions**

| Field               | Description  |
|---------------------|--|
| Crashed pid         | Process ID (PID) of the crashed process followed by the executable path. |
| Crash time          | Time and date the crash occurred.  |
| Core for process at | File path to the core dump file.   |

| Field          | Description  |
|----------------|--|
| Stack Trace    | Stack trace information.   |
| Registers Info | Register information related to crashed threads.                               |
| DLL Info       | Dynamically loadable library (DLL) information used to decode the stack trace. |

**Related Topics**

[clear context](#), on page 2

# show dll

To display dynamically loadable library (DLL) information, use the **show dll** command in administration EXEC mode or in EXEC mode.

```
show dll [{jobid job-id [virtual] | [symbol]address virtual-address | dllname dll-virtual-path | memory | virtual}] [location node-id]
```

| Syntax Description                     |  |  |
|--|--|--|
| <b>jobid</b> <i>job-id</i>             | (Optional) Displays DLL information for the specified job identifier.  |  |
| <b>virtual</b>                         | (Optional) Displays the virtual path of DLLs. The virtual path is expressed in the /pkg/lib/library-name.dll format where the library name is the name of the DLL followed by the .dll suffix. |  |
| <b>symbol</b>                          | (Optional) Displays the symbol at the virtual address specified for the <i>virtual-address</i> argument.   |  |
| <b>address</b> <i>virtual-address</i>  | (Optional) Displays the DLL that is mapped at the virtual address specified for the <i>virtual-address</i> argument.   |  |
| <b>dllname</b> <i>dll-virtual-path</i> | (Optional) Displays the process IDs (PIDs) of the process that have downloaded the DLL specified for the <i>dll-virtual-path</i> argument.   |  |
| <b>memory</b>                          | (Optional) Displays a summary of DLL memory usage.   |  |
| <b>location</b> <i>node-id</i>         | (Optional) Displays DLLs for the specified node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation.   |  |

**Command Default** No default behavior or values

**Command Modes** EXEC, Administration EXEC

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | read       |

The following example shows sample output from the **show dll** command. In this example, the output displays all the DLLs loaded on the router.

```
RP/0/RSP0/CPU0:router# show dll
```

| DLL path  | Text VA    | Text Sz    | Data VA     | Data Sz    | Refcount |
|---|------------|------------|-------------|------------|----------|
| /lib/libui.dll  | 0xfc000000 | 0x00007000 | 0xfc007000  | 0x00001000 | 1        |
| /disk0/asr9k-base-0.48.0/lib/liblogin.dll                   | 0xfc008000 | 0x00006000 | 0xfc00e000  | 0x00001000 | 1        |
| /mbi/lib/libbanner.dll                                      | 0xfc00f000 | 0x00003000 | 0xfc012000  | 0x00001000 | 1        |
| /disk0/asr9k-base-0.48.0/lib/libaaav2.dll                   | 0xfc013000 | 0x0000f000 | 0xfc022000  | 0x00001000 | 1        |
| /disk0/asr9k-base-0.48.0/lib/libaaatty.dll                  | 0xfc023000 | 0x00004000 | 0xfc027000  | 0x00001000 | 1        |
| /mbi/lib/libtermcap.dll                                     | 0xfc028000 | 0x00003000 | 0xfc02b000  | 0x00001000 | 1        |
| /mbi/lib/lib_show_dll.dll                                   | 0xfc02c000 | 0x00004000 | 0xfc030000  | 0x00001000 | 1        |
| /mbi/lib/libihplatform.dll                                  | 0xfc0bf2d4 | 0x0000c18  | 0xfc1e4f88  | 0x0000068  | 1        |
| /lib/libovl.dll   | 0xfc0c8000 | 0x0000c3b0 | 0xfc0c21f0  | 0x0000076c | 23       |
| /disk0/asr9k-admin-0.48.0/lib/libfqm_ltrace_util_common.dll | 0xfc0d43b0 | 0x00000bfc | 0xfc391f7c  | 0x00000068 | 1        |
| /lib/libplatform.dll  | 0xfc0d5000 | 0x0000aa88 | 0xfc0e0000  | 0x00002000 | 165      |
| /lib/libsysmgr.dll  | 0xfc0e2000 | 0x0000ab48 | 0xfc0c295c  | 0x00000368 | 166      |
| /lib/libinfra.dll   | 0xfc0ed000 | 0x0003284c | 0xfc120000  | 0x00000c70 | 169      |
| /lib/libbios.dll  | 0xfc121000 | 0x0002c4bc | 0xfc14e000  | 0x00002000 | 166      |
| /lib/libc.dll   | 0xfc150000 | 0x00077ae0 | 0xfc1c8000  | 0x00002000 | 175      |
| /mbi/lib/libltrace.dll                                      | 0xfc1ca000 | 0x00007f5c | 0xfc0c2cc4  | 0x00000188 | 96       |
| /lib/libsyslog.dll  | 0xfc1d2000 | 0x0000530c | 0xfc120c70  | 0x00000308 | 129      |
| /disk0/asr9k-base-0.48.0/lib/liblpts_ifib_platform.dll      | 0xfc1d730c | 0x00000cc8 | 0xfccef4000 | 0x00000068 | 1        |
| /lib/libbackplane.dll                                       | 0xfc1d8000 | 0x0000134c | 0xfc0c2e4c  | 0x000000a8 | 163      |
| /disk0/asr9k-base-0.48.0/lib/libipv6_platform_client.dll    | 0xfc1d934c | 0x00000c48 | 0xfccef4f8c | 0x00000068 | 1        |
| /mbi/lib/libpkgfs_node.dll                                  | 0xfc1da000 | 0x000092d4 | 0xfc1e4000  | 0x000001a8 | 3        |

The following example shows sample output from the **show dll** command with the optional **jobid** *job-id* keyword and argument:

```
RP/0/RSP0/CPU0:router# show dll jobid 186
```

| DLLs mapped by PID 86111 |            |            |            |            |          |
|--------------------------|------------|------------|------------|------------|----------|
| DLL path                 | Text VA    | Text Sz    | Data VA    | Data Sz    | Refcount |
| /lib/libovl.dll          | 0xfc0c8000 | 0x0000c3b0 | 0xfc0c21f0 | 0x0000076c | 23       |
| /lib/libplatform.dll     | 0xfc0d5000 | 0x0000aa88 | 0xfc0e0000 | 0x00002000 | 165      |
| /lib/libsysmgr.dll       | 0xfc0e2000 | 0x0000ab48 | 0xfc0c295c | 0x00000368 | 167      |
| /lib/libinfra.dll        | 0xfc0ed000 | 0x0003284c | 0xfc120000 | 0x00000c70 | 169      |
| /lib/libbios.dll         | 0xfc121000 | 0x0002c4bc | 0xfc14e000 | 0x00002000 | 166      |
| /lib/libc.dll            | 0xfc150000 | 0x00077ae0 | 0xfc1c8000 | 0x00002000 | 175      |
| /mbi/lib/libltrace.dll   | 0xfc1ca000 | 0x00007f5c | 0xfc0c2cc4 | 0x00000188 | 96       |
| /lib/libsyslog.dll       | 0xfc1d2000 | 0x0000530c | 0xfc120c70 | 0x00000308 | 129      |
| /lib/libbackplane.dll    | 0xfc1d8000 | 0x0000134c | 0xfc0c2e4c | 0x000000a8 | 163      |
| /lib/libnodeid.dll       | 0xfc1e5000 | 0x000091fc | 0xfc1e41a8 | 0x00000208 | 163      |
| /mbi/lib/libinst_mem.dll | 0xfc232000 | 0x000044f8 | 0xfc1e43b0 | 0x00000108 | 4        |
| /lib/libdebug.dll        | 0xfc23c000 | 0x0000ef64 | 0xfc1e4680 | 0x00000550 | 159      |

[Table 5: show dll Field Descriptions, on page 41](#) describes the significant fields shown in the display.



**Table 5: show dll Field Descriptions**

| Field    | Description                                     |
|----------|---|
| DLL path | Physical path of the DLL on the router.         |
| Text VA  | Virtual address of the text segment of the DLL. |
| Text Sz  | Size of the text segment of the DLL.            |
| Data VA  | Virtual address of the data segment of the DLL. |
| Data Sz  | Size of the data segment of the DLL.            |
| Refcount | Number of clients using the DLL.                |

The following example shows sample output from the **show dll** command with the optional **dllname** *dll-virtual-path* keyword and optional argument:

```
RP/0/RSP0/CPU0:router# show dll dllname /pkg/lib/libinst_mem.dll

PID:      4102  Refcount: 1
PID:      4105  Refcount: 1
PID:     24600  Refcount: 1
PID:     86111  Refcount: 1
```

[Table 6: show dll dllname Field Descriptions, on page 41](#) describes the significant fields shown in the display.

**Table 6: show dll dllname Field Descriptions**

| Field    | Description                                     |
|----------|---|
| PID:     | Process ID of the process.                      |
| Refcount | Number of references to the DLL by the process. |

The following example shows sample **show dll** output from the command with the optional **memory** keyword:

```
RP/0/RSP0/CPU0:router# show dll memory
-----
Total DLL Text - 14778896 bytes  Total DLL Data - 12688500 bytes
Total DLL Memory - 27467396 bytes
```

# show exception

To display the configured core dump settings, use the **show exception** command in administration EXEC mode or in EXEC mode.

**show exception** [**core-options** [**process** *process-name*] **location** *node-id*]

| Syntax Description | core-options                | (Optional) Displays process core option values.   |
|--------------------|-----------------------------|---|
|                    | process <i>process-name</i> | (Optional) Specifies the process for which to display the information.  |
|                    | location <i>node-id</i>     | (Optional) Displays configured settings for a specified node. The <i>node-id</i> argument is expressed in the <i>rack/slot/module</i> notation. |

**Command Default** None

**Command Modes** EXEC, Administration EXEC

| Command History | Release       | Modification   |
|-----------------|---------------|--|
|                 | Release 3.7.2 | This command was introduced.                           |
|                 | Release 3.9.0 | Support for the <b>core-options</b> keyword was added. |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **show exception** command to display the configured core dump settings. The output from this command displays the core dump settings configured with the following commands:

- [exception filepath](#), on page 8
- [exception pakmem](#), on page 12
- [exception sparse](#), on page 14
- [exception sprsize](#), on page 16

| Task ID | Task ID | Operations |
|---------|---------|------------|
|         | diag    | read       |

The following example shows sample output from the **show exception** command with the **location** keyword. All processes for the specified node are displayed.

```
RP/0/RSP0/CPU0:router# show excep core-options location 0/rp0/cpu0
Mon Nov 30 01:31:31.391 PST
```

```

Process
  Options
attach_server:
  TEXT SHAREDMEM MAINMEM
attachd:
  TEXT SHAREDMEM MAINMEM
ksh-aux:
  TEXT SHAREDMEM MAINMEM
bcm_logger:
  TEXT SHAREDMEM MAINMEM
devf-scrp:
  TEXT SHAREDMEM MAINMEM
bfm_server:
  TEXT SHAREDMEM MAINMEM
ksh:
  TEXT SHAREDMEM MAINMEM
dllmgr:
  COPY
dumper:
  TEXT SHAREDMEM MAINMEM
eth_server:
  COPY SPARSE
inflator:
  TEXT SHAREDMEM MAINMEM
insthelper:
  TEXT SHAREDMEM MAINMEM
mbi-hello:
  TEXT SHAREDMEM MAINMEM
cat:
  TEXT SHAREDMEM MAINMEM
mq:
  COPY
mqueue:
  TEXT SHAREDMEM MAINMEM
nname:
  TEXT SHAREDMEM MAINMEM
nvram:
  TEXT SHAREDMEM MAINMEM
--More--

```

The following example shows sample output from the **show exception** command for a specific process:

```

RP/0/RSP0/CPU0:router# show excep core-options process upgrade_daemon location 0/6/cpu0

Mon Nov 30 01:32:20.207 PST
Process
  Options
upgrade_daemon:
  TEXT SHAREDMEM MAINMEM

```

### Related Topics

- [exception filepath](#), on page 8
- [exception pakmem](#), on page 12
- [exception sparse](#), on page 14
- [exception sprsize](#), on page 16

## show memory

To display the available physical memory and memory usage information of processes on the router, use the **show memory** command in EXEC or administration EXEC mode.

**show memory** [*jobid* | **summary** [{*bytes* | *detail*}] ] **location** *node-id*

| Syntax Description             |   |
|--------------------------------|---|
| <i>job id</i>                  | (Optional) Job ID associated with a process instance. Specifying a job ID for the <i>job-id</i> argument displays the memory available and memory usage information for only the process associated with the specified job ID. If the <i>job-id</i> argument is not specified, this command displays information for all running processes. |
| <b>summary</b>                 | (Optional) Displays a summary of the physical memory and memory usage information.  |
| <b>bytes</b>                   | (Optional) Displays numbers in bytes for an exact count.  |
| <b>detail</b>                  | (Optional) Displays numbers in the format “nnn.dddM” for more detail.   |
| <b>location</b> <i>node-id</i> | Displays the available physical memory from the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.  |

**Command Default** None

**Command Modes** Administration EXEC  
EXEC

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** To display detailed memory information for the entire router, enter the **show memory** command without any parameters.

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | read       |

This example shows partial sample output from the **show memory** command entered without keywords or arguments. This command displays details for the entire router.

```
RP/0/RSP0/CPU0:router# show memory

Physical Memory:2048M total
Application Memory :1802M (1636M available)
Image:116M (bootram:116M)
Reserved:128M, IOMem:0, flashfsys:0
Total shared window:0
```

```

kernel:jid 1
Address      Bytes      What
0008f000    12288     Program Stack
000b2000    12288     Program Stack
Total Allocated Memory:0
Total Shared Memory:0

sbin/devc-pty:jid 68
Address      Bytes      What
4817f000    4096      Program Stack (pages not allocated)
48180000    516096   Program Stack (pages not allocated)
481fe000    8192     Program Stack
48200000    28672    Physical Mapped Memory
48207000    4096     ANON FIXED ELF SYSRAM
48208000    4096     ANON FIXED ELF SYSRAM

```

This example shows sample output from the **show memory** command entered with the job ID 7 to show the memory usage information for the process associated with this job identifier:

```

RP/0/RSP0/CPU0:router# show memory 7

Physical Memory: 256M total
Application Memory : 249M (217M available)
Image: 2M (bootram: 2M)
Reserved: 4M, IOMem: 0, flashfsys: 0

sbin/pipe: jid 7
Address      Bytes      What
07f7c000    126976   Program Stack (pages not allocated)
07f9b000    4096     Program Stack
07f9d000    126976   Program Stack (pages not allocated)
07fbc000    4096     Program Stack
07fbe000    126976   Program Stack (pages not allocated)
07fdd000    4096     Program Stack
07fdf000    126976   Program Stack (pages not allocated)
07ffe000    4096     Program Stack
08000000    122880   Program Stack (pages not allocated)
0801e000    8192     Program Stack
08020000    12288    Physical Mapped Memory
08023000    4096     Program Text or Data
08024000    4096     Program Text or Data
08025000    16384    Allocated Memory
08029000    16384    Allocated Memory
7c001000    319488   DLL Text libc.dll
7e000000    8192     DLL Data libc.dll

```

This example shows how to display a detailed summary of memory information for the router:

```

RP/0/RSP0/CPU0:router# show memory summary detail

Physical Memory: 256.000M total
Application Memory : 140.178M (15.003M available)
Image: 95.739M (bootram: 95.739M)
Reserved: 20.000M, IOMem: 0, flashfsys: 0
Shared window fibv6: 257.980K
Shared window PFI_IFH: 207.925K
Shared window aib: 8.972M
Shared window infra_statsd: 3.980K
Shared window ipv4_fib: 1.300M

```

```

Shared window atc_cache: 35.937K
Shared window qad: 39.621K
Total shared window: 10.805M
Allocated Memory: 49.933M
Program Text: 6.578M
Program Data: 636.000K
Program Stack: 4.781M

```

**Table 7: show memory summary Field Descriptions**

| Field                      | Description  |
|----------------------------|--|
| Physical Memory            | Available physical memory on the router.                         |
| Application Memory         | Current memory usage of all the processes on the router.         |
| Image                      | Memory that is currently used by the image and available memory. |
| Reserved                   | Total reserved memory.   |
| IOMem                      | Available I/O memory.  |
| flashfsys                  | Total flash memory.  |
| Shared window fibv6        | Internal shared window information.                              |
| Shared window PFI_IFH      | Internal shared window information.                              |
| Shared window aib          | Internal shared window information.                              |
| Shared window infra_statsd | Internal shared window information.                              |
| Shared window ipv4_fib     | Internal shared window information.                              |
| Shared window atc_cache    | Internal shared window information.                              |
| Shared window qad          | Internal shared window information.                              |
| Total shared window        | Internal shared window information.                              |
| Allocated Memory           | Amount of memory allocated for the specified node.               |
| Program Text               | Internal program test information.                               |
| Program Data               | Internal program data information.                               |
| Program Stack              | Internal program stack information.                              |

### Related Topics

[show memory heap](#), on page 50

[show processes](#), on page 54

# show memory compare

To display details about heap memory usage for all processes on the router at different moments in time and compare the results, use the **show memory compare** command in EXEC or administration EXEC mode.

**show memory compare** {start | end | report}

| Syntax Description |   |
|--------------------|---|
| <b>start</b>       | Takes the initial snapshot of heap memory usage for all processes on the router and sends the report to a temporary file named /tmp/memcmp_start.out.   |
| <b>end</b>         | Takes the second snapshot of heap memory usage for all processes on the router and sends the report to a temporary file named /tmp/memcmp_end.out. This snapshot is compared with the initial snapshot when displaying the heap memory usage comparison report. |
| <b>report</b>      | Displays the heap memory comparison report, comparing heap memory usage between the two snapshots of heap memory usage.   |

**Command Default** None

**Command Modes** Administration EXEC  
EXEC

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** Use the **show memory compare** command to display details about the heap memory usage of all processes on the router at different moments in time and compare the results. This command is useful for detecting patterns of memory usage during events such as restarting processes or configuring interfaces.

Use the following steps to create and compare memory snapshots:

1. Enter the **show memory compare** command with the **start** keyword to take the initial snapshot of heap memory usage for all processes on the router.



**Note** The snapshot is similar to that resulting from entry of the [show memory heap, on page 50](#) command with the optional **summary** keyword.

2. Perform the test you want to analyze.
3. Enter the **show memory compare** command with the **end** keyword to take the snapshot of heap memory usage to be compared with the initial snapshot.
4. Enter the **show memory compare** command with the **report** keyword to display the heap memory usage comparison report.

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | read       |

This example shows sample output from the **show memory compare** command with the **report** keyword:

```
RP/0/RSP0/CPU0:router# show memory compare report
```

| JID | name                 | mem before | mem after | difference | mallocs | restarted |
|-----|----------------------|------------|-----------|------------|---------|-----------|
| --- | ----                 | -----      | -----     | -----      | -----   | -----     |
| 84  | driver_infra_partner | 577828     | 661492    | 83664      | 65      |           |
| 279 | gsp                  | 268092     | 335060    | 66968      | 396     |           |
| 236 | snap_transport       | 39816      | 80816     | 41000      | 5       |           |
| 237 | mpls_lsd_agent       | 36340      | 77340     | 41000      | 5       |           |
| 268 | fint_partner         | 24704      | 65704     | 41000      | 5       |           |
| 90  | null_caps_partner    | 25676      | 66676     | 41000      | 5       |           |
| 208 | aib                  | 55320      | 96320     | 41000      | 5       |           |
| 209 | ipv4_io              | 119724     | 160724    | 41000      | 5       |           |
| 103 | loopback_caps_partne | 33000      | 74000     | 41000      | 5       |           |
| 190 | ipv4_arm             | 41432      | 82432     | 41000      | 5       |           |
| 191 | ipv6_arm             | 33452      | 74452     | 41000      | 5       |           |
| 104 | sysldr               | 152164     | 193164    | 41000      | 5       |           |
| 85  | nd_partner           | 37200      | 78200     | 41000      | 5       |           |
| 221 | clns                 | 61520      | 102520    | 41000      | 5       |           |
| 196 | parser_server        | 1295440    | 1336440   | 41000      | 5       |           |
| 75  | bundlemgr_distrib    | 57424      | 98424     | 41000      | 5       |           |
| 200 | arp                  | 83720      | 124720    | 41000      | 5       |           |
| 201 | cdp                  | 56524      | 97524     | 41000      | 5       |           |
| 204 | ether_caps_partner   | 39620      | 80620     | 41000      | 5       |           |
| 206 | qosmgr               | 55624      | 96624     | 41000      | 5       |           |
| 240 | imd_server           | 92880      | 104680    | 11800      | 28      |           |
| 260 | improxy              | 77508      | 88644     | 11136      | 10      |           |
| 111 | nrssvr               | 29152      | 37232     | 8080       | 60      |           |
| 275 | sysdb_svr_local      | 1575532    | 1579056   | 3524       | 30      |           |
| 205 | cfgmgr               | 31724      | 33548     | 1824       | 25      |           |
| 99  | sysdb_svr_shared     | 1131188    | 1132868   | 1680       | 14      |           |
| 51  | mbus-rp              | 26712      | 27864     | 1152       | 4       |           |
| 66  | wdsysmon             | 298068     | 299216    | 1148       | 15      |           |
| 168 | netio                | 1010912    | 1012060   | 1148       | 6       |           |
| 283 | itrace_manager       | 17408      | 17928     | 520        | 3       |           |
| 59  | devc-conaux          | 109868     | 110300    | 432        | 4       |           |
| 67  | syslogd_helper       | 289200     | 289416    | 216        | 2       |           |
| 117 | fctl                 | 41596      | 41656     | 60         | 2       |           |
| 54  | sysmgr               | 171772     | 171076    | -696       | -5      |           |
| 269 | ifmgr                | 539308     | 530652    | -8656      | -196    | *         |

**Table 8: show memory compare report Field Descriptions**

| Field      | Description                            |
|------------|--|
| JID        | Process job ID.                        |
| name       | Process name.                          |
| mem before | Heap memory usage at start (in bytes). |



| Field      | Description  |
|------------|--|
| mem after  | Heap memory usage at end (in bytes).                           |
| difference | Difference in heap memory usage (in bytes).                    |
| mallocs    | Number of unfreed allocations made during the test period.     |
| restarted  | Indicates if the process was restarted during the test period. |

**Related Topics**

[show memory heap](#), on page 50

[show processes](#), on page 54

## show memory heap

To display information about the heap space for a process, use the **show memory heap** command in EXEC or administration EXEC mode.

**show memory heap** [**allocated**] [**dllname**] [**failure**] [**free**] {*jobid* | **all**}

| Syntax Description |            |  |
|--------------------|------------|--|
| <b>allocated</b>   | (Optional) | Displays a list of all allocated heap blocks.  |
| <b>dllname</b>     | (Optional) | Displays heaps with dynamic link library (DLL) names.  |
| <b>failure</b>     | (Optional) | Displays a summary of heap failures.   |
| <b>free</b>        | (Optional) | Displays a list of all free heap blocks.   |
| <b>summary</b>     | (Optional) | Displays a summary of the information about the heap space.  |
| <i>job-id</i>      |            | Job ID associated with the process instance.   |
| <b>all</b>         | (Optional) | Displays information about the heap space for all processes. The <b>all</b> keyword is only available when the <b>failure</b> or <b>summary</b> keywords are used. |

**Command Default** None

**Command Modes** Administration EXEC  
EXEC

| Command History | Release       | Modification                 |
|-----------------|---------------|------------------------------|
|                 | Release 3.7.2 | This command was introduced. |
|                 | Release 3.9.0 | No modification.             |

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

| Task ID | Task ID        | Operations |
|---------|----------------|------------|
|         | basic-services | read       |

This example shows sample output from the **show memory heap** command, specifying a job ID for the *job-id* argument:

```
RP/0/RSP0/CPU0:router# show memory heap 111
```

```

Malloc summary for pid 16433:
  Heapsize 16384: allocd 6328, free 8820, overhead 1236
  Calls: mallocs 144; reallocs 73; frees 5; [core-allocs 1; core-frees 0]
Block Allocated List
Total      Total      Block      Name/ID/Caller
Usizes    Sizes      Counts
0x000008c1 0x000008cc 0x00000001 0x7c018a10
0x000005ac 0x00000974 0x00000079 0x7c02b9e0
0x000004f0 0x000004f8 0x00000001 0x7c02b6fc
0x00000080 0x00000088 0x00000001 0x7c01936c
0x00000034 0x00000048 0x00000001 0x7c018954
0x00000024 0x00000030 0x00000001 0x7c019278
0x00000018 0x00000020 0x00000001 0x7c019b2c
0x00000008 0x00000010 0x00000001 0x7c017178
0x00000008 0x00000010 0x00000001 0x7c00fb54
0x00000008 0x00000010 0x00000001 0x7c00fb80
0x00000008 0x00000010 0x00000001 0x7c00fbb8

```

Table 9: show memory heap Field Descriptions

| Field                         | Description   |
|-------------------------------|---|
| Malloc summary for pid        | System-defined process ID (PID).  |
| Heapsize                      | Size of the heap as allocated from the system by the malloc library.  |
| allocd                        | Bytes allocated to the process.   |
| free                          | Bytes available in the heap.  |
| overhead                      | Malloc library overhead in bytes.   |
| mallocs                       | Number of malloc calls.   |
| reallocs                      | Number of realloc calls.  |
| frees                         | Number of invocations to the caller interface provided in the malloc library for deallocating the memory.                       |
| [core-allocs 1; core-frees 0] | Number of core memory units, the memory units in the malloc library allocated by the system for the heap, allocated, and freed. |

The following example shows sample output from the **show memory heap** command, specifying the **summary job-id** keyword and argument:

```

RP/0/RSP0/CPU0:router# show memory heap summary 65

Malloc summary for pid 20495 process pcmciad:
  Heapsize 65536: allocd 40332, free 16568, overhead 8636
  Calls: mallocs 883; reallocs 3; frees 671; [core-allocs 4; core-frees 0]
Band size 16, element per block 48, nbuint 1
Completely free blocks: 0
Block allocated: 2, Block freed: 0
allocs: 85, frees: 20
allocmem: 1040, freemem: 496, overhead: 448

```

```

blocks: 2, blknodes: 96
Band size 24, element per block 34, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 243, frees: 223
allocmem: 480, freemem: 336, overhead: 168
blocks: 1, blknodes: 34
Band size 32, element per block 26, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 107, frees: 97
allocmem: 320, freemem: 512, overhead: 136
blocks: 1, blknodes: 26
Band size 40, element per block 22, nbuint 1
Completely free blocks: 0
Block allocated: 2, Block freed: 0
allocs: 98, frees: 74
allocmem: 960, freemem: 800, overhead: 240
blocks: 2, blknodes: 44
Band size 48, element per block 18, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 53, frees: 42
allocmem: 528, freemem: 336, overhead: 104
blocks: 1, blknodes: 18
Band size 56, element per block 16, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 8, frees: 4
allocmem: 224, freemem: 672, overhead: 96
blocks: 1, blknodes: 16
Band size 64, element per block 14, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 6, frees: 2
allocmem: 256, freemem: 640, overhead: 88
blocks: 1, blknodes: 14
Band size 72, element per block 12, nbuint 1
Completely free blocks: 0
Block allocated: 1, Block freed: 0
allocs: 1, frees: 0
allocmem: 72, freemem: 792, overhead: 80
blocks: 1, blknodes: 12

```

**Table 10: show memory heap summary Field Descriptions**

| Field                  | Description  |
|------------------------|--|
| Malloc summary for pid | System-defined process ID (pid).                                     |
| Heapsize               | Size of the heap as allocated from the system by the malloc library. |
| allocd                 | Bytes allocated to the process.                                      |
| free                   | Bytes available in the heap.   |
| overhead               | Malloc library overhead in bytes.                                    |
| mallocs                | Number of malloc calls.  |

| Field                         | Description  |
|-------------------------------|--|
| reallocs                      | Number of realloc calls.   |
| frees                         | Number of invocations to the caller interface provided in the malloc library for deallocating the memory.                              |
| [core-allocs 1; core-frees 0] | Number of core memory units, the memory units in the malloc library allocated by the system for the heap, allocated and freed.         |
| Band size                     | Small memory elements are arranged in bands. The band size specifies the size of elements within the band.                             |
| element per block             | Number of elements per block in the band.  |
| nbunit                        | Number of memory unit one block consists of. Any block in any band should be of a size that is an integer multiple of this basic unit. |
| Completely free blocks        | Number of blocks in the band completely free (available for allocation).   |
| Block alloced                 | Number of blocks currently allocated for the band.   |
| allocs                        | Number of allocations currently performed from the band.   |
| frees                         | Number of free calls that resulted in memory being returned to the band.   |
| allocmem                      | Amount of memory currently allocated from the band.  |
| overhead                      | Amount of memory in bytes as overhead for managing the band.   |
| blocks                        | Number of blocks currently in the band.  |
| blknodes                      | Number of nodes (elements) in all the blocks in the band.  |

**Related Topics**

[show memory](#), on page 44

# show processes

To display information about active processes, use the **show processes** command in EXEC or administration EXEC mode.

**show processes** {*job-id**process-name* | **aborts** | **all** | **blocked** | **boot** | **cpu** | **distribution** *process-name* | **dynamic** | **failover** | **family** | **files** | **location** *node-id* | **log** | **mandatory** | **memory** | **pidin** | **searchpath** | **signal** | **startup** | **threadname**} [**location** *node-id*] [**detail**] [**run**]

| Syntax                         | Description   |
|--------------------------------|---|
| <i>job-id</i>                  | Job identifier for which information for only the process instance associated with the <i>job-id</i> argument is displayed.                             |
| <i>process-name</i>            | Process name for which all simultaneously running instances are displayed, if applicable.   |
| <b>aborts</b>                  | Displays process abort information.   |
| <b>all</b>                     | Displays summary process information for all processes.   |
| <b>blocked</b>                 | Displays details about reply, send, and mutex blocked processes.  |
| <b>boot</b>                    | Displays process boot information.  |
| <b>cpu</b>                     | Displays CPU usage for each process.  |
| <b>distribution</b>            | Displays the distribution of processes.   |
| <b>dynamic</b>                 | Displays process data for dynamically created processes.  |
| <b>failover</b>                | Displays process switchover information.  |
| <b>family</b>                  | Displays the process session and family information.  |
| <b>files</b>                   | Displays information about open files and open communication channels.  |
| <b>location</b> <i>node-id</i> | Displays information about the active processes from a designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation. |
| <b>log</b>                     | Displays process log.   |
| <b>mandatory</b>               | Displays process data for mandatory processes.  |
| <b>memory</b>                  | Displays information about the text, data, and stack usage for processes.   |
| <b>pidin</b>                   | Displays all processes using the QNX command.   |
| <b>searchpath</b>              | Displays the search path.   |
| <b>signal</b>                  | Displays the signal options for blocked, pending, ignored, and queued signals.  |
| <b>startup</b>                 | Displays process data for processes created at startup.   |
| <b>threadname</b>              | Displays thread names.  |

|               |  |
|---------------|--|
| <b>detail</b> | (Optional) Displays more detail. This option is available only with the <i>process-name</i> argument.                            |
| <b>run</b>    | (Optional) Displays information for only running processes. This option is available only with the <i>process-name</i> argument. |

**Command Default** None

**Command Modes** Administration EXEC  
EXEC

| <b>Command History</b> | <b>Release</b> | <b>Modification</b>          |
|------------------------|----------------|------------------------------|
|                        | Release 3.7.2  | This command was introduced. |
|                        | Release 3.9.0  | No modification.             |

**Usage Guidelines** Use the **show processes** command to display general information about the active processes. To display more detailed information for a process, specify a job ID or process for the *job-id* argument or *process-name* argument, respectively.

You can also use the **monitor processes** command to determine the top processes and threads based on CPU usage.

| <b>Task ID</b> | <b>Task ID</b> | <b>Operations</b> |
|----------------|----------------|-------------------|
|                | basic-services | read              |

The **show processes** command with the *process-name* argument displays detailed information about a process:

```
RP/0/RSP0/CPU0:router# show processes ospf

Tue Jul 28 09:23:17.212 DST
      Job Id: 338
      PID: 336152
      Executable path: /disk0/asr9k-rout-3.9.0.14I/bin/ospf
      Instance #: 1
      Version ID: 00.00.0000
      Respawn: ON
      Respawn count: 1
      Max. spawns per minute: 12
      Last started: Tue Jul 14 15:26:26 2009
      Process state: Run
      Package state: Normal
      Started on config: cfg/gl/ipv4-ospf/proc/100/ord_z/config
      core: MAINMEM
      Max. core: 0
      Placement: Placeable
      startup_path: /pkg/startup/ospf.startup
      Ready: 1.312s
      Available: 1.334s
      Process cpu time: 93.382 user, 13.902 kernel, 107.284 total
JID  TID CPU Stack pri state      TimeInState  HR:MM:SS:MSEC  NAME
```

```

338  1  0  116K  10 Receive      0:00:00:0375  0:00:47:0139 ospf
338  2  0  116K  10 Receive      0:00:05:0734  0:00:00:0029 ospf
338  3  1  116K  10 Receive      0:00:06:0765  0:00:00:0056 ospf
338  4  1  116K  10 Receive      0:00:00:0096  0:00:00:0698 ospf
338  5  1  116K  10 Receive      0:49:33:0609  0:00:00:0129 ospf
338  6  1  116K  10 Sigwaitinfo 329:56:49:0531 0:00:00:0000 ospf
338  7  0  116K  10 Receive      0:00:00:0816  0:00:58:0676 ospf
338  8  1  116K  10 Receive      0:00:06:0765  0:00:00:0043 ospf
338  9  1  116K  10 Condvar      82:30:01:0311 0:00:00:0029 ospf
338 10  1  116K  10 Receive      82:30:05:0188 0:00:00:0478 ospf
338 11  0  116K  10 Receive      329:54:49:0318 0:00:00:0005 ospf
-----

```

Table 11: show processes Field Descriptions

| Field                  | Description   |
|------------------------|---|
| Job id                 | Job ID. This field remains constant over process restarts.  |
| PID                    | Process ID. This field changes when process is restarted.   |
| Executable path        | Path for the process executable.  |
| Instance               | There may be more than one instance of a process running at a given time (each instance may have more than one thread). |
| Version ID             | API version.  |
| Respawn                | ON or OFF. The field indicates if this process restarts automatically in case of failure.                               |
| Respawn count          | Number of times this process has been started or restarted (that is, the first start makes this count 1).               |
| Max. spawns per minute | Number of respawns not to be exceeded in 1 minute. If this number is exceeded, the process stops restarting.            |
| Last started           | Date and time the process was last started.   |
| Process state          | Current state of the process.   |
| Started on config      | Configuration command that started (or would start) this process.   |
| core                   | Memory segments to include in core file.  |
| Max. core              | Number of times to dump a core file. 0 = infinity.  |

The **show processes** command with the **memory** keyword displays details of memory usage for a given process or for all processes, as shown in the following example:

```

RP/0/RSP0/CPU0:router# show processes memory

JID   Text      Data      Stack     Dynamic  Process
55    28672     4096     69632    17072128 eth_server
317   167936    4096     45056    10526720 syslogd
122   512000    4096     77824    9797632  bgp
265   57344     4096     57344    5877760  parser_server

```



```

254 40960 4096 143360 3084288 netio
63 8192 4096 24576 2314240 nvram
314 4096 4096 36864 1699840 sysdb_svr_local
341 495616 4096 40960 1576960 wdsysmon
259 53248 4096 28672 1490944 nvgen_server
189 32768 4096 32768 1425408 hd_drv
69 77824 4096 110592 1421312 qnet
348 323584 4096 40960 1392640 ospf
347 323584 4096 40960 1392640 ospf
346 323584 4096 40960 1392640 ospf
345 323584 4096 40960 1392640 ospf
344 323584 4096 40960 1392640 ospf
261 323584 4096 40960 1392640 ospf
--More--

```

Table 12: show processes memory Field Descriptions

| Field   | Description  |
|---------|--|
| JID     | Job ID.  |
| Text    | Size of text region (process executable).                      |
| Data    | Size of data region (initialized and uninitialized variables). |
| Stack   | Size of process stack.   |
| Dynamic | Size of dynamically allocated memory.                          |
| Process | Process name.  |

The **show processes** command with the **all** keyword displays summary information for all processes, as shown in the following example:

```
RP/0/RSP0/CPU0:router# show processes all
```

```

      JID      LAST STARTED          STATE  RE-   PLACE-  MANDA-  MAINT-  NAME (IID)  ARGS
          START  MENT     TORY    MODE
-----
      82      03/16/2007 14:54:52.488 Run     1           M       Y       wd-mpi(1)
      58      03/16/2007 14:54:52.488 Run     1           M       Y       dllmgr(1)-r 60 -u
30
      74      03/16/2007 14:54:52.488 Run     1           M       Y       pkgfs(1)
      57      03/16/2007 14:54:52.488 Run     1           Y       devc-conaux(1) -h
-d
                                           librs232.dll -m
                                           libconaux.dll -u
                                           libst16550.dll
      76      03/16/2007 14:54:52.488 Run     1           Y       devc-pty(1) -n 32
      56      Not configured          None    0           Y       clock_chip(1) -r
-b
--More--

```

**Table 13: show processes all Field Description**

| Field        | Description   |
|--------------|---|
| JID          | Job ID.   |
| Last Started | Date when the process was last started.   |
| State        | State of the process.   |
| Restart      | Number of times the process has restarted since the node was booted. If a node is reloaded, the restart count for all processes is reset. Normally, this value is 1, because usually processes do not restart. However, if you restart a process using the <b>process restart</b> command, the restart count for the process increases by one.        |
| Placement    | Indicates whether the process is a placeable process or not. Most processes are not placeable, so the value is blank. ISIS, OSPF, and BGP are examples of placeable processes.  |
| Mandatory    | M indicates that the process is mandatory. A mandatory process must be running. If a mandatory process cannot be started (for example, sysmgr starts it but it keeps crashing), after five attempts the sysmgr causes the node to reload in an attempt to correct the problem. A node cannot function properly if a mandatory process is not running. |
| Maint Mode   | Indicates processes that should be running when a node is in maintenance mode. Maintenance mode is intended to run as few processes as possible to perform diagnostics on a card when a problem is suspected. However, even the diagnostics require some services running.  |
| Name (IID)   | Name of the process followed by the instance ID. A process can have multiple instances running, so the IID is the instance ID.  |
| Args         | Command-line arguments to the process.  |

**Related Topics**

[monitor processes](#)

[monitor threads](#), on page 25