

Configuring Cisco Secure PIX Firewall 6.0 and Cisco VPN Client Using IPSec

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Introduction

Cisco Secure PIX Firewall Software Releases 6.0 and later support connections from Cisco VPN Client 3.x and 4.x. This sample configuration shows two different versions of VPN Clients that connect and encrypt traffic with the PIX as the tunnel endpoint. In this configuration, a pool of addresses is configured to be assigned for IP Security (IPSec).

Prerequisites

Requirements

This sample configuration assumes that the PIX already operates with appropriate statics, conduits, or access lists. This document is not intended to illustrate these basic concepts, but to show connectivity to the PIX from a Cisco VPN Client.

Components Used

The information in this document is based on these software and hardware versions:

- PIX Software Release 6.2(1)

Note: This setup was tested on PIX Software Release 6.2(1), but should work on earlier releases back to 6.0(1) as well as later releases.

- Cisco VPN Client version 3.6 Rel

Note: This setup was tested on VPN Client v4.0 Rel, but should work on earlier releases back to 3.0 and up to the current release.

The information in this document was created from the devices in a specific lab environment. All of the

devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

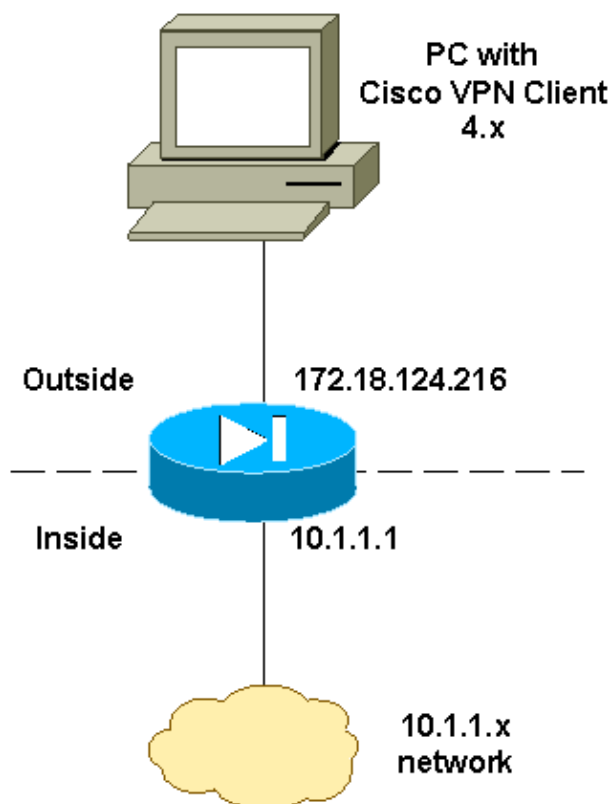
Refer to Cisco Technical Tips Conventions for more information on document conventions.

Configure

In this section, you are presented with the information to configure the features described in this document.

Network Diagram

This document uses this network setup:



Configure the PIX

Note: Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

PIX
<pre>PIX Version 6.2(1) nameif ethernet0 outside security0 nameif ethernet1 inside security100 enable password OnTrBUG1Tp0edmkr encrypted passwd 2KFQnbNIdI.2KYOU encrypted hostname goss-d3-pix515b domain-name rtp.cisco.com fixup protocol ftp 21 fixup protocol http 80</pre>

```

fixup protocol h323 1720
fixup protocol rsh 514
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol sip 5060
fixup protocol skinny 2000
names
!

!--- Access list to avoid Network Address Translation (NAT)
!--- on the IPsec packets.

access-list 101 permit ip 10.1.1.0 255.255.255.0 10.1.2.0 255.255.255.0
pager lines 24
interface ethernet0 auto
interface ethernet1 auto
mtu outside 1500
mtu inside 1500
!

!--- IP addresses on the interfaces

ip address outside 172.18.124.216 255.255.255.0
ip address inside 10.1.1.1 255.255.255.0
ip audit info action alarm
ip audit attack action alarm
ip local pool ippool 10.1.2.1-10.1.2.254
no failover
failover timeout 0:00:00
failover poll 15
failover ip address outside 0.0.0.0
failover ip address inside 0.0.0.0
pdm history enable
arp timeout 14400
!

!--- Binding ACL 101 to the NAT statement to avoid NAT
!--- on the IPsec packets.

nat (inside) 0 access-list 101
!

!--- Default route to the Internet.

route outside 0.0.0.0 0.0.0.0 172.18.124.1 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc 0:10:00
    h323 0:05:00 sip 0:30:00 sip_media 0:02:00
timeout uauth 0:05:00 absolute
aaa-server TACACS+ protocol tacacs+
aaa-server RADIUS protocol radius
http server enable
http 1.2.3.5 255.255.255.255 inside
no snmp-server location
no snmp-server contact
snmp-server community public
no snmp-server enable traps
floodguard enable
!

!--- The sysopt command avoids conduit
!--- on the IPsec encrypted traffic.

sysopt connection permit-ipsec
no sysopt route dnat
!

```

```

/--- Phase 2 encryption type

crypto ipsec transform-set myset esp-des esp-md5-hmac
crypto dynamic-map dynmap 10 set transform-set myset
crypto map mymap 10 ipsec-isakmp dynamic dynmap
!

/--- Binding the IPSec engine on the outside interface.

crypto map mymap interface outside
!

/--- Enabling Internet Security Association and
/--- Key Management Protocol (ISAKMP) key exchange.

isakmp enable outside
isakmp identity address
!

/--- ISAKMP policy for VPN Client running 3.x or 4.x code.

isakmp policy 10 authentication pre-share
isakmp policy 10 encryption des
isakmp policy 10 hash md5
isakmp policy 10 group 2
isakmp policy 10 lifetime 86400
!

/--- IPSec group configuration for either VPN Client.

vpngroup vpn3000 address-pool ippool
vpngroup vpn3000 dns-server 10.1.1.2
vpngroup vpn3000 wins-server 10.1.1.2
vpngroup vpn3000 default-domain cisco.com
vpngroup vpn3000 idle-time 1800
vpngroup vpn3000 password *****

/--- To allow simultaneous access to the
/--- internal network and to the Internet.

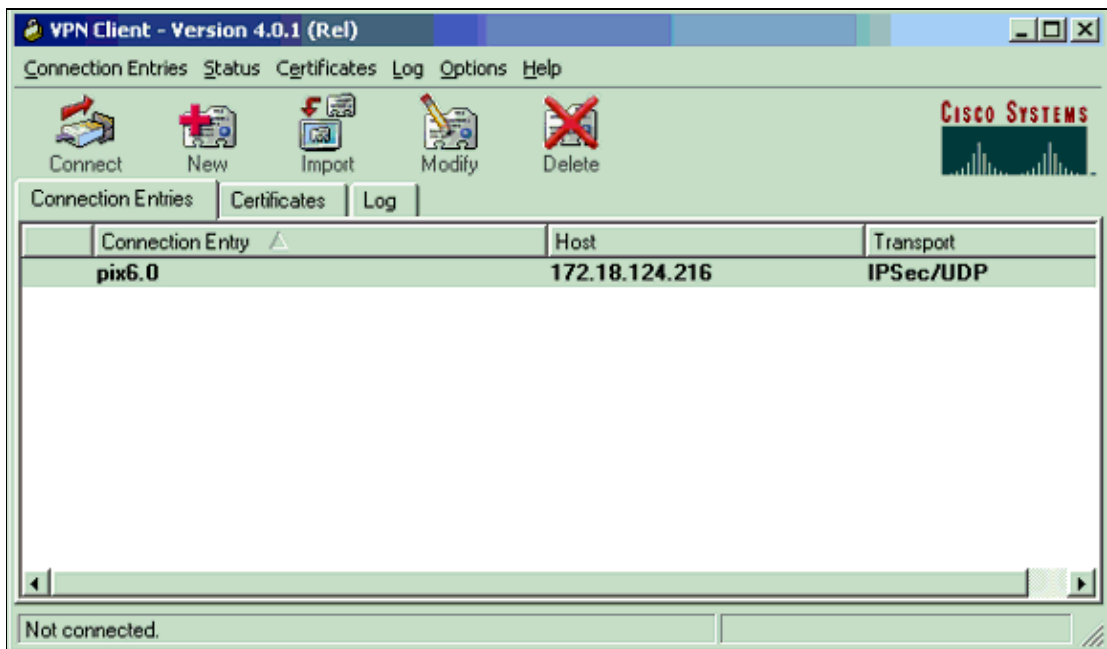
vpngroup vpn3000 split-tunnel 101
telnet timeout 5
ssh timeout 5
terminal width 80
Cryptochecksum:94da63fc0bb8ce167407b3ea21c6642c
: end
[OK]

```

Configure the Cisco VPN Client

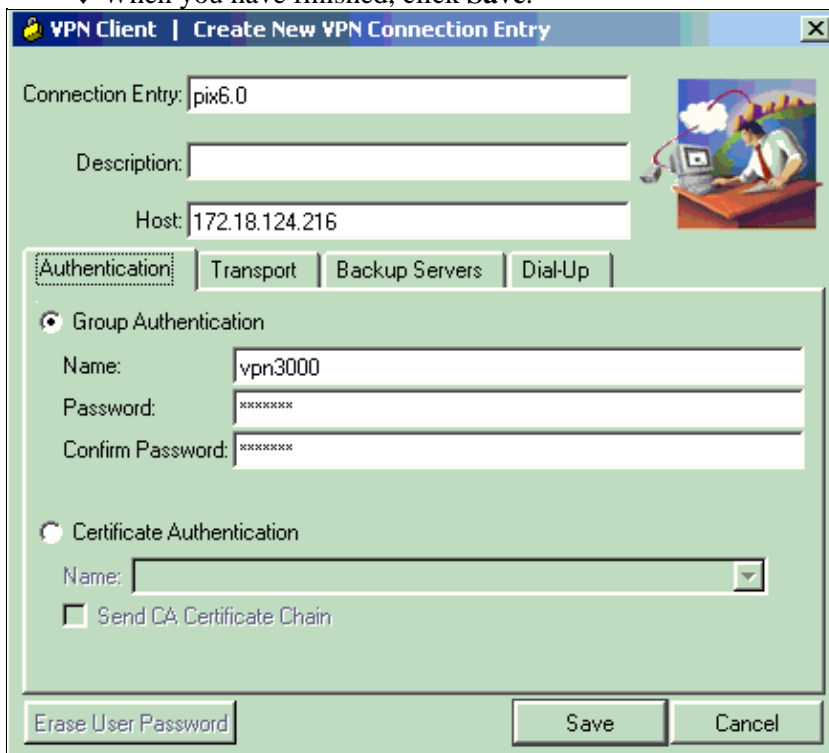
Complete these steps in order to create a new connection using the VPN Client.

1. Launch the VPN Client, and then click **New** to create a new connection.

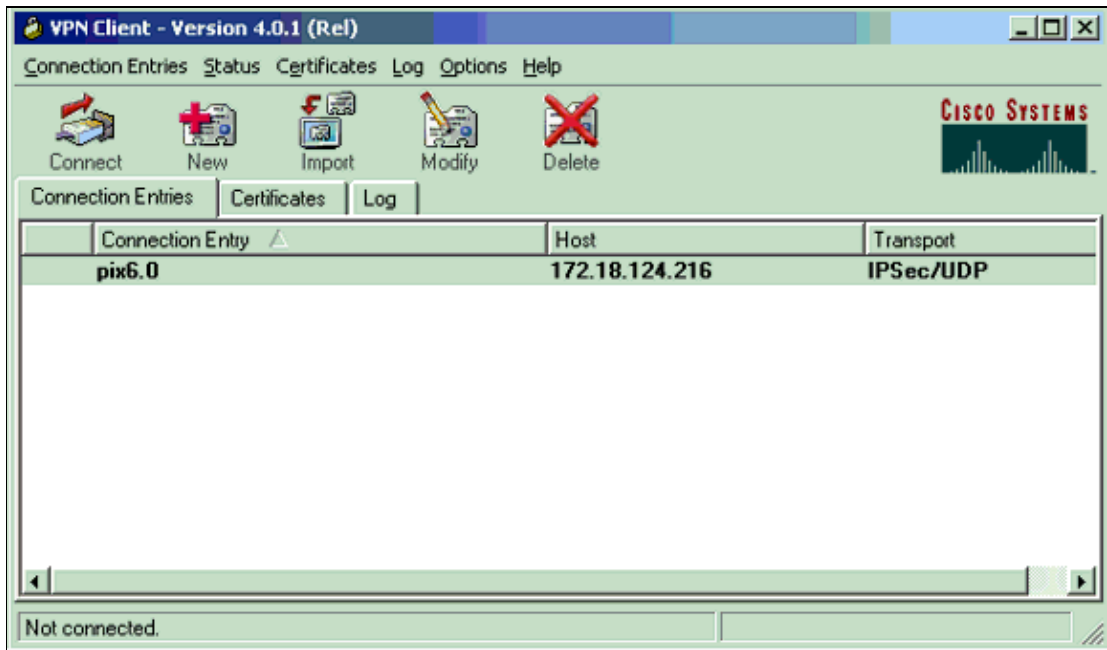


2. Enter configuration information for the new connection.

- ◆ In the Connection Entry field, assign a name to your entry.
- ◆ In the Host field, enter the IP address of the public interface of the PIX.
- ◆ Choose the **Authentication** tab, and then enter the group and password (twice – for confirmation).
- ◆ When you have finished, click **Save**.



3. Click **Connect** to connect to the PIX.



Verify

Use this section to confirm that your configuration works properly.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

- **show crypto isakmp sa** View all current Internet Key Exchange (IKE) security associations (SAs) at a peer.
- **show crypto ipsec sa** View the settings used by current SAs.

Troubleshoot

Use this section to troubleshoot your configuration.

Troubleshooting Commands

Note: Refer to Important Information on Debug Commands before you use **debug** commands.

- **debug crypto ipsec** Use to see the IPsec negotiations of phase 2.
- **debug crypto isakmp** Use to see the ISAKMP negotiations of phase 1.
- **debug crypto engine** Shows the traffic that is encrypted.

Sample Debug Output

This is a sample of a good debug generated with the Cisco VPN 3.0.x Client:

```
goss-d3-pix515b#debug crypto isakmp
goss-d3-pix515b#debug crypto ipsec
goss-d3-pix515b#debug crypto engine
goss-d3-pix515b#show debug
debug crypto ipsec 1
debug crypto isakmp 1
debug crypto engine
debug fover status
```

tx Off
rx Off
open Off
cable Off
txdmp Off
rxdmp Off
ifc Off
rxip Off
txip Off
get Off
put Off
verify Off
switch Off
fail Off
fmsg Off

goss-d3-pix515b# goss-d3-pix515b#

crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_AG exchange

ISAKMP (0): processing SA payload. message ID = 0

ISAKMP (0): Checking ISAKMP transform 1 against priority 10 policy

ISAKMP: encryption 3DES-CBC

ISAKMP: hash SHA

ISAKMP: default group 2

ISAKMP: extended auth pre-share

ISAKMP: life type in seconds

ISAKMP: life duration (VPI) of 0x0 0x20 0xc4 0x9b

ISAKMP (0): atts are not acceptable. Next payload is 3

ISAKMP (0): Checking ISAKMP transform 2 against priority 10 policy

ISAKMP: encryption 3DES-CBC

ISAKMP: hash MD5

ISAKMP: default group 2

ISAKMP: extended auth pre-share

ISAKMP: life type in seconds

ISAKMP: life duration (VPI) of 0x0 0x20 0xc4 0x9b

ISAKMP (0): atts are not acceptable. Next payload is 3

ISAKMP (0): Checking ISAKMP transform 3 against priority 10 policy

ISAKMP: encryption 3DES-CBC

ISAKMP: hash SHA

ISAKMP: default group 2

ISAKMP: auth pre-share

ISAKMP: life type in seconds

ISAKMP: life duration (VPI) of 0x0 0x20 0xc4 0x9b

ISAKMP (0): atts are not acceptable. Next payload is 3

ISAKMP (0): Checking ISAKMP transform 4 against priority 10 policy

ISAKMP: encryption 3DES-CBC

ISAKMP: hash MD5

ISAKMP: default group 2

ISAKMP: auth pre-share

ISAKMP: life type in seconds

ISAKMP: life duration (VPI) of 0x0 0x20 0xc4 0x9b

ISAKMP (0): atts are not acceptable. Next payload is 3

ISAKMP (0): Checking ISAKMP transform 5 against priority 10 policy

ISAKMP: encryption DES-CBC

ISAKMP: hash SHA

ISAKMP: default group 2

ISAKMP: extended auth pre-share

ISAKMP: life type in seconds

ISAKMP: life duration (VPI) of 0x0 0x20 0xc4 0x9b

ISAKMP (0): atts are not acceptable. Next payload is 3

ISAKMP (0): Checking ISAKMP transform 6 against priority 10 policy

ISAKMP: encryption DES-CBC

ISAKMP: hash MD5

ISAKMP: default group 2

ISAKMP: extended auth pre-share

ISAKMP: life type in seconds

```
ISAKMP:      life duration (VPI) of 0x0 0x20 0xc4 0x9b
ISAKMP (0): atts are not acceptable. Next payload is 3
ISAKMP (0): Checking ISAKMP transform 7 against priority 10 policy
ISAKMP:      encryption DES-CBC
ISAKMP:      hash SHA
ISAKMP:      default group 2
ISAKMP:      auth pre-share
ISAKMP:      life type in seconds
ISAKMP:      life duration (VPI) of 0x0 0x20 0xc4 0x9b
ISAKMP (0): atts are not acceptable. Next payload is 3
ISAKMP (0): Checking ISAKMP transform 8 against priority 10 policy
ISAKMP:      encryption DES-CBC
ISAKMP:      hash MD5
ISAKMP:      default group 2
ISAKMP:      auth pre-share
ISAKMP:      life type in seconds
ISAKMP:      life duration (VPI) of 0x0 0x20 0xc4 0x9b
ISAKMP (0): atts are acceptable. Next payload is 0
ISAKMP (0): processing KE payload. message ID = 0

ISAKMP (0): processing NONCE payload. message ID = 0

ISAKMP (0): processing ID payload. message ID = 0
ISAKMP (0): processing vendor id payload

ISAKMP (0): processing vendor id payload

ISAKMP (0): remote peer supports dead peer detection

ISAKMP (0): processing vendor id payload

ISAKMP (0): speaking to a Unity client

ISAKMP: Created a peer node for 172.18.124.96
ISAKMP (0): ID payload
      next-payload : 10
      type          : 1
      protocol      : 17
      port          : 500
      length        : 8
ISAKMP (0): Total payload length: 12
return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_AG exchange
ISAKMP (0): processing HASH payload. message ID = 0
ISAKMP (0): processing NOTIFY payload 24578 protocol 1
      spi 0, message ID = 0
ISAKMP (0): processing notify INITIAL_CONTACT
IPSEC(key_engine): got a queue event...
IPSEC(key_engine_delete_sas): rec'd delete notify from ISAKMP
IPSEC(key_engine_delete_sas): delete all SAs shared
      with 172.18.124.96

ISAKMP (0): SA has been authenticated
return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
ISAKMP_TRANSACTION exchange
ISAKMP (0:0): processing transaction payload
      from 172.18.124.96. message ID = 0
ISAKMP: Config payload CFG_REQUEST
ISAKMP (0:0): checking request:
ISAKMP: attribute      IP4_ADDRESS (1)
ISAKMP: attribute      IP4_NETMASK (2)
ISAKMP: attribute      IP4_DNS (3)
ISAKMP: attribute      IP4_NBNS (4)
ISAKMP: attribute      ADDRESS_EXPIRY (5)
```

```
        Unsupported Attr: 5
ISAKMP: attribute    APPLICATION_VERSION (7)
        Unsupported Attr: 7
ISAKMP: attribute    UNKNOWN (28672)
        Unsupported Attr: 28672
ISAKMP: attribute    UNKNOWN (28673)
        Unsupported Attr: 28673
ISAKMP: attribute    UNKNOWN (28674)
ISAKMP: attribute    UNKNOWN (28676)
ISAKMP: attribute    UNKNOWN (28679)
        Unsupported Attr: 28679
ISAKMP (0:0): responding to peer config from 172.18.124.96.
        ID = 525416177
return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_QM exchange
oakley_process_quick_mode:
OAK_QM_IDLE
ISAKMP (0): processing SA payload. message ID = 805890102

ISAKMP : Checking IPsec proposal 1

ISAKMP: transform 1, ESP_3DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-MD5
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
IPSEC(validate_proposal): transform proposal (prot 3, trans 3,
        hmac_alg 1) not supported

ISAKMP (0): atts not acceptable. Next payload is 0
ISAKMP (0): skipping next ANDED proposal (1)
ISAKMP : Checking IPsec proposal 2

ISAKMP: transform 1, ESP_3DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-SHA
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
IPSEC(validate_proposal): transform proposal (prot 3, trans 3,
        hmac_alg 2) not supported

ISAKMP (0): atts not acceptable. Next payload is 0
ISAKMP (0): skipping next ANDED proposal (2)
ISAKMP : Checking IPsec proposal 3

ISAKMP: transform 1, ESP_3DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-MD5
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
IPSEC(validate_proposal): transform proposal (prot 3, trans 3,
        hmac_alg 1) not supported

ISAKMP (0): atts not acceptable. Next payload is 0
ISAKMP : Checking IPsec proposal 4

ISAKMP: transform 1, ESP_3DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-SHA
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
```

```
IPSEC(validate_proposal): transform proposal (prot 3, trans 3,
    hmac_alg 2) not supported

ISAKMP (0): atts not acceptable. Next payload is 0
ISAKMP : Checking IPsec proposal 5

ISAKMP: transform 1, ESP_DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-MD5
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
ISAKMP (0): atts are acceptable.
ISAKMP (0): bad SPI size of 2 octets!
ISAKMP : Checking IPsec proposal 6

ISAKMP: transform 1, ESP_DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-SHA
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
IPSEC(validate_proposal): transform proposal (prot 3, trans 2,
    hmac_alg 2) not supported

ISAKMP (0): atts not acceptable. Next payload is 0
ISAKMP (0): skipping next ANDED proposal (6)
ISAKMP : Checking IPsec proposal 7

ISAKMP: transform 1, ESP_DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-MD5
ISAKMP:    encaps is 1
ISAKMP:    SA life type in seconds
ISAKMP:    SA life duration (VPI) of  0x0 0x20 0xc4 0x9b
ISAKMP (0): atts are acceptable.
IPSEC(validate_proposal_request): proposal part #1,
    (key eng. msg.) dest= 172.18.124.216, src= 172.18.124.96,
    dest_proxy= 172.18.124.216/255.255.255.255/0/0 (type=1),
    src_proxy= 10.1.2.1/255.255.255.255/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4

ISAKMP (0): processing NONCE payload. message ID = 805890102

ISAKMP (0): processing ID payload. message ID = 805890102
ISAKMP (0): ID_IPV4_ADDR src 10.1.2.1 prot 0 port 0
ISAKMP (0): processing ID payload. message ID = 805890102
ISAKMP (0): ID_IPV4_ADDR dst 172.18.124.216 prot 0 port 0
IPSEC(key_engine): got a queue event...
IPSEC(spi_response): getting spi 0x13b00d31(330304817) for SA
    from 172.18.124.96 to 172.18.124.216 for prot 3

return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_QM exchange
oakley_process_quick_mode:
OAK_QM_IDLE
ISAKMP (0): processing SA payload. message ID = 935083707

ISAKMP : Checking IPsec proposal 1

ISAKMP: transform 1, ESP_3DES
ISAKMP:  attributes in transform:
ISAKMP:    authenticator is HMAC-MD5
```

```
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_QM exchange
oakley_process_quick_mode:
OAK_QM_AUTH_AWAITmap_alloc_entry: allocating entry 1
map_alloc_entry: allocating entry 2
ISAKMP (0): Creating IPsec SAs
    inbound SA from 172.18.124.96 to 172.18.124.216
        (proxy 10.1.2.1 to 172.18.124.216)
    has spi 330304817 and conn_id 1 and flags 4
    lifetime of 2147483 seconds
    outbound SA from 172.18.124.216 to 172.18.124.96
        (proxy 172.18.124.216 to 10.1.2.1)
    has spi 2130279708 and conn_id 2 and flags 4
    lifetime of 2147483 secondsIPSEC(key_engine): got a queue event...
IPSEC(initialize_sas): ,
    (key eng. msg.) dest= 172.18.124.216, src= 172.18.124.96,
    dest_proxy= 172.18.124.216/0.0.0.0/0/0 (type=1),
    src_proxy= 10.1.2.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 2147483s and 0kb,
    spi= 0x13b00d31(330304817), conn_id= 1, keysize= 0, flags= 0x4
IPSEC(initialize_sas): ,
    (key eng. msg.) src= 172.18.124.216, dest= 172.18.124.96,
    src_proxy= 172.18.124.216/0.0.0.0/0/0 (type=1),
    dest_proxy= 10.1.2.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 2147483s and 0kb,
    spi= 0x7ef97dlc(2130279708), conn_id= 2, keysize= 0, flags= 0x4

return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
OAK_QM exchange
oakley_process_quick_mode:
OAK_QM_AUTH_AWAITmap_alloc_entry: allocating entry 3
map_alloc_entry: allocating entry 4

ISAKMP (0): Creating IPsec SAs
    inbound SA from 172.18.124.96 to 172.18.124.216
        (proxy 10.1.2.1 to 0.0.0.0)
    has spi 4139858833 and conn_id 3 and flags 4
    lifetime of 2147483 seconds
    outbound SA from 172.18.124.216 to 172.18.124.96 (
        proxy 0.0.0.0 to 10.1.2.1)
    has spi 1487433401 and conn_id 4 and flags 4
    lifetime of 2147483 seconds
IPSEC(key_engine): got a queue event...
IPSEC(initialize_sas): ,
    (key eng. msg.) dest= 172.18.124.216, src= 172.18.124.96,
    dest_proxy= 0.0.0.0/0.0.0.0/0/0 (type=4),
    src_proxy= 10.1.2.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 2147483s and 0kb,
    spi= 0xf6IPSEC(initialize_sas): ,
    (key eng. msg.) src= 172.18.124.216, dest= 172.18.124.96,
    src_proxy= 0.0.0.0/0.0.0.0/0/0 (type=4),
    dest_proxy= 10.1.2.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 2147483s and 0kb,
    spi= 0x58a86eb9(1487433401), conn_id= 4, keysize= 0, flags= 0x4

return status is IKMP_NO_ERROR
crypto_isakmp_process_block: src 172.18.124.96, dest 172.18.124.216
ISAKMP (0): processing NOTIFY payload 36136 protocol 1
    spi 0, message ID = 1617869510
ISAKMP (0): received DPD_R_U_THERE from peer 172.18.124.96
ISAKMP (0): sending NOTIFY message 36137 protocol 1
```

```
return status is IKMP_NO_ERR_NO_TRANS
goss-d3-pix515b#
goss-d3-pix515b#
goss-d3-pix515b#no debug crypto isakmp
goss-d3-pix515b#no debug crypto ipsec
goss-d3-pix515b#no debug crypto engine
goss-d3-pix515b#
```

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Security: Firewalling

Related Information

- [IPSec Support Pages](#)
- [Documentation for PIX Firewall](#)
- [Cisco Secure PIX Firewall Command References](#)
- [Cisco PIX 500 Series Security Appliances Support Page](#)
- [Request for Comments \(RFCs\)](#)
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