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show crypto ace redundancy

To display information about a Blade Failure Group, use the **show crypto ace redundancy** command in privileged EXEC mode.

show crypto ace redundancy

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|--------------|---|
| 12.2(18)SXE2 | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Examples

The following example shows information about a Blade Failure Group that has a group ID of 1 and consists of two IPsec VPN SPAs--one IPsec VPN SPA is in slot 3, subslot 0 and one IPsec VPN SPA is in slot 5, subslot 0:

```

Router# show crypto ace redundancy
-----
LC Redundancy Group ID          :1
Pending Configuration Transactions:0
Current State                   :OPERATIONAL
Number of blades in the group   :2
Slots
-----
Slot:3 Subslot:0
Slot state:0x36
Booted
Received partner config
Completed Bulk Synchronization
Crypto Engine in Service
Rebooted 22 times
Initialization Timer not running
Slot:5 Subslot:0
Slot state:0x36
Booted
Received partner config
Completed Bulk Synchronization
Crypto Engine in Service
Rebooted 24 times
Initialization Timer not running
ACE B2B Group State:OPERATIONAL Event:BULK DONE
ACE B2B Group State:CREATED Event:CONFIG_DOWNLOAD_DONE
ACE B2B Group State:DELETED Event:CONFIG_DELETE
ACE B2B Group State:OPERATIONAL Event:BULK DONE
ACE B2B Group State:CREATED Event:CONFIG_DOWNLOAD_DONE
ACE B2B Group State:DELETED Event:CONFIG_DELETE

```

```
ACE B2B Group State:OPERATIONAL Event:CONFIG_DOWNLOAD_DONE
ACE B2B Group State:DELETED Event:CONFIG_ADD
ACE B2B Group State:CREATED Event:UNDEFINED B2B HA EVENT
ACE B2B Group State:CREATED Event:CONFIG_DOWNLOAD_DONE
```

Related Commands

| Command | Description |
|---------------------------------------|---|
| linecard-group feature card | Assigns a group ID to a Blade Failure Group. |
| redundancy | Enters redundancy configuration mode. |
| show redundancy linecard-group | Displays the components of a Blade Failure Group. |

show crypto ca certificates



Note This command was replaced by the **show crypto pki certificates** command effective with Cisco IOS Release 12.3(7)T.

To display information about your certificate, the certification authority certificate, and any registration authority certificates, use the **show crypto ca certificates** command in EXEC mode.

show crypto ca certificates

Syntax Description This command has no arguments or keywords.

Command Modes
EXEC

| Release | Modification |
|---------|------------------------------|
| 11.3 T | This command was introduced. |

Usage Guidelines This command shows information about the following certificates:

- Your certificate, if you have requested one from the CA (see the **crypto pki enroll** command)
- The certificate of the CA, if you have received the CA's certificate (see the **crypto pki authenticate** command)
- RA certificates, if you have received RA certificates (see the **crypto pki authenticate** command)

Examples

The following is sample output from the **show crypto ca certificates** command after you authenticated the CA by requesting the CA's certificate and public key with the **crypto pki authenticate** command:

```
CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
```

The CA certificate might show Key Usage as "Not Set."

The following is sample output from the **show crypto ca certificates** command, and shows the router's certificate and the CA's certificate. In this example, a single, general purpose RSA key pair was previously generated, and a certificate was requested but not received for that key pair.

```
Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
    Serial Number: 04806682
  Status: Pending
  Key Usage: General Purpose
  Fingerprint: 428125BD A3419600 3F6C7831 6CD8FA95 00000000
```

```

CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set

```

Note that in the previous sample, the router's certificate Status shows "Pending." After the router receives its certificate from the CA, the Status field changes to "Available" in the **show** output.

The following is sample output from the **show crypto ca certificates** command, and shows two router's certificates and the CA's certificate. In this example, special usage RSA key pairs were previously generated, and a certificate was requested and received for each key pair.

```

Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
  Status: Available
  Certificate Serial Number: 428125BDA34196003F6C78316CD8FA95
  Key Usage: Signature

```

```

Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
  Status: Available
  Certificate Serial Number: AB352356AFCD0395E33CCFD7CD33897
  Key Usage: Encryption

```

```

CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set

```

The following is sample output from the **show crypto ca certificates** command when the CA supports an RA. In this example, the CA and RA certificates were previously requested with the **crypto ca authenticate** command.

```

CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
RA Signature Certificate
  Status: Available
  Certificate Serial Number: 34BCF8A0
  Key Usage: Signature

RA KeyEncipher Certificate
  Status: Available
  Certificate Serial Number: 34BCF89F
  Key Usage: Encryption

```

Related Commands

| Command | Description |
|----------------------------------|---|
| crypto pki authenticate | Authenticates the CA (by obtaining the certificate of the CA). |
| crypto pki enroll | Obtains the certificates of your router from the CA. |
| debug crypto pki messages | Displays debug messages for the details of the interaction (message dump) between the CA and the route. |

| Command | Description |
|--------------------------------------|--|
| debug crypto pki transactions | Displays debug messages for the trace of interaction (message type) between the CA and the router. |

show crypto ca crls



Note This command was replaced by the **show crypto pki crls** command effective with Cisco IOS Release 12.3(7)T.

To display the current certificate revocation list (CRL) on router, use the **show crypto ca crls** command in EXEC mode.

show crypto ca crls

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 12.1 | This command was introduced. |

Examples

The following is sample output of the **show crypto ca crls** command:

```
Router# show crypto ca crls

CRL Issuer Name:
OU = sjvpn, O = cisco, C = us
LastUpdate: 16:17:34 PST Jan 10 2002
NextUpdate: 17:17:34 PST Jan 11 2002
Retrieved from CRL Distribution Point:
LDAP: CN = CRL1, OU = sjvpn, O = cisco, C = us
```

| Related Commands | Command | Description |
|------------------|-------------------------------|--|
| | crypto pki crl request | Requests that a new CRL be obtained immediately from the CA. |

show crypto ca roots

The **show crypto ca roots** command is replaced by the **show crypto ca trustpoints** command. See the **show crypto ca trustpoints** command for more information.

show crypto ca timers



Note This command was replaced by the **show crypto pki timers** command effective with Cisco IOS Release 12.3(8)T.

To display the status of the managed timers that are maintained by Cisco IOS for public key infrastructure (PKI), use the **show crypto ca timers** command in EXEC mode.

show crypto ca timers

Syntax Description This command has no arguments or keywords.

Command Modes
EXEC

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 12.2(8)T | This command was introduced. |
| | 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |

Usage Guidelines For each timer, this command displays the time remaining before the timer expires. It also associates trustpoint certification authorities (CAs), except for certificate revocation list (CRL) timers, by displaying the CRL distribution point.

Examples The following example is sample output for the **show crypto ca timers** command:

```
Router# show crypto ca timers
PKI Timers
| 4d15:13:33.144
| 4d15:13:33.144 CRL http://msca-root.cisco.com/CertEnroll/msca-root.crl
|328d11:56:48.372 RENEW msroot
| 6:43.201 POLL verisign
```

| Related Commands | Command | Description |
|------------------|------------------------------|--|
| | auto-enroll | Enables autoenrollment. |
| | crypto pki trustpoint | Declares the CA that your router should use. |

show crypto ca trustpoints



Note This command was replaced by the **show crypto pki trustpoints** command effective with Cisco IOS Release 12.3(7)T and 12.2(18)SXD.

To display the trustpoints that are configured in the router, use the **show crypto pki trustpoints** command in privileged EXEC or user EXEC mode.

show crypto ca trustpoints

Syntax Description This command has no arguments or keywords.

Command Modes

Privileged EXEC
User EXEC

Command History

| Release | Modification |
|----------|------------------------------|
| 12.2(8)T | This command was introduced. |

Usage Guidelines

This command replaces the show crypto ca roots command. If you enter the show crypto ca roots command, the output will be written back as the show crypto pki trustpoints command.

Examples

The following is sample output from the **show crypto ca trustpoints** command:

```
Router# show crypto ca trustpoints
Trustpoint bo:
  Subject Name:
    CN = bomborra Certificate Manager
    O = cisco.com
    C = US
    Serial Number:01
  Certificate configured.
  CEP URL:http://bomborra
  CRL query url:ldap://bomborra
```

Related Commands

| Command | Description |
|------------------------------|--|
| crypto pki trustpoint | Declares the CA that your router should use. |

show crypto call admission statistics

To monitor Crypto Call Admission Control (CAC) statistics, use the **show crypto call admission statistics** command in user EXEC or privileged EXEC mode.

show crypto call admission statistics

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

| Release | Modification |
|--------------|---|
| 12.3(8)T | This command was introduced. |
| 12.2(18)SXD1 | This command was integrated into Cisco IOS Release 12.2(18)SXD1. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 15.1(3)T | This command was modified. The output of this command was updated to display information about IPsec SAs. |

Usage Guidelines

You can use this command to display information about Crypto CAC configuration parameters and their history, including statistics regarding the current security association (SA) count, one or more SA being negotiated, total new SA requests, the number of Internet Key Exchange (IKE) and IPsec SA requests accepted and rejected, and details regarding rejected SA requests.

Examples

The following is sample output from the **show crypto call admission statistics** command:

```
Router# show crypto call admission statistics

-----
Crypto Call Admission Control Statistics
-----
System Resource Limit:      111 Max IKE SAs:      0 Max in nego: 1000
Total IKE SA Count:        0 active:          0 negotiating:  0
Incoming IKE Requests:     0 accepted:       0 rejected:     0
Outgoing IKE Requests:     0 accepted:       0 rejected:     0
Rejected IKE Requests:     0 rsrc low:       0 Active SA limit: 0
                                           In-neg SA limit: 0

IKE packets dropped at dispatch:      0
Max IPSEC SAs:      111
Total IPSEC SA Count:      0 active:          0 negotiating:  0
Incoming IPSEC Requests:   0 accepted:       0 rejected:     0
Outgoing IPSEC Requests:   0 accepted:       0 rejected:     0
Phase1.5 SAs under negotiation:      0
```

The table below shows significant fields shown in the display.

Table 1: show crypto call admission statistics Field Descriptions

| Field | Description |
|----------------------------------|--|
| System Resource Limit | Percentage of system resources that a router is using before IKE starts dropping all SA requests. |
| Max IKE SAs | Number of active IKE SA requests allowed on the router. |
| Total IKE SA Count | Number of IKE SAs. |
| active | Number of active SAs. |
| negotiating | Number of SA requests being negotiated. |
| Incoming IKE Requests | Number of incoming IKE SA requests. |
| Incoming IKE Requests accepted | Number of accepted IKE SA requests. |
| Incoming IKE Requests rejected | Number of rejected incoming IKE SA requests. |
| Outgoing IKE Requests | Number of outgoing IKE SA requests. |
| Outgoing IKE requests accepted | Number of accepted outgoing IKE SA requests. |
| Outgoing IKE requests rejected | Number of rejected outgoing IKE SA requests. |
| Rejected IKE Requests | Number of IKE requests that were rejected. |
| rsrc low | Number of IKE requests that were rejected because system resources were low or the preconfigured system resource limit was exceeded. |
| SA limit | Number of IKE SA requests that were rejected because the SA limit has been reached. |
| Incoming IPSEC Requests | Number of incoming IPsec SA requests. |
| Incoming IPSEC Requests accepted | Number of accepted IPsec SA requests. |
| Incoming IPSEC Requests rejected | Number of rejected incoming IPsec SA requests. |
| Outgoing IPSEC Requests | Number of outgoing IPsec SA requests. |
| Outgoing IPSEC requests accepted | Number of accepted outgoing IPsec SA requests. |
| Outgoing IPSEC requests rejected | Number of rejected outgoing IPsec SA requests. |
| Phase1.5 SAs | Number of negotiations in XAUTH or configuration exchange mode. |

Related Commands

| Command | Description |
|---|---|
| clear crypto call admission statistics | Clears counters that track the number of accepted and rejected IKE SA requests. |

show crypto ctcp

To display information about a Cisco Tunnel Control Protocol (cTCP) session, use the **show crypto ctcp** command in privileged EXEC mode.

show crypto ctcp [**peer** *ip-address*] [**detail**]

Syntax Description

| | |
|-------------------|--|
| peer | (Optional) Displays information about a specific peer. |
| <i>ip-address</i> | (Optional) IP address of the specific peer. |
| detail | (Optional) Displays information about the local TCP sequence number and the TCP sequence number of the packets for the peer. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|----------|------------------------------|
| 12.4(9)T | This command was introduced. |

Examples

The following **show** command output displays detailed information about a specific peer:

```
Router# show crypto ctcp peer 10.76.235.21 detail
Remote           Local           VRF           Status
10.76.235.21:3519 10.76.248.239:10000
                  LocalSeq#6807392F RemoteSeq#010116C7
```

The table below provides information about significant fields in the display.

Table 2: show crypto ctcp Field Descriptions

| Field | Description |
|-----------|---|
| Remote | IP address of the remote peer with which this cTCP session is set up. |
| Local | IP address of the server to which the cTCP packets are addressed. |
| VRF | Name of the Virtual Private Network routing and forwarding (VRF) instance to which this session belongs. If the VRF is blank, the global routing table is used. |
| Status | Status of the cTCP session. CTCP_ACK_R is a successful cTCP setup. Any other state indicates that cTCP is not yet set up or failed to be set up. |
| LocalSeq | Sequence number of the last Transmission Control Protocol (TCP) packet sent by the server on this connection. |
| RemoteSeq | Sequence number of the last TCP packet that was received by the peer on this connection. |

Related Commands

| Command | Description |
|----------------|---|
| crypto ctcp | Configures cTCP encapsulation for Easy VPN. |

show crypto datapath

To display the counters that help troubleshoot an encrypted data path, use the **show crypto datapath** command in privileged EXEC mode.

```
show crypto datapath {ipv4 | ipv6} {realtime | snapshot} {all | non-zero} [{error | internal | punt | success}]
```

| Syntax Description | | |
|--------------------|---|--|
| ipv4 | Designate IPv4 is used in the network. | |
| ipv6 | Designate IPv6 is used in the network. | |
| realtime | Displays the counters that capture traffic statistics as they occur. | |
| snapshot | Displays the counters that capture traffic statistics as of a single point in time. | |
| all | Display all counters. | |
| non-zero | Display all counters that have at least one event recorded. | |
| <i>error</i> | (Optional) Display the packet processing and dropped packet errors. | |
| internal | (Optional) Track the movement of a packet from end to end across an encrypted data path. | |
| punt | (Optional) Display the instances when the configured processing method failed, and an alternative was used. | |
| success | (Optional) Display the interfaces where packets were successfully processed. | |

Command Default The command defaults are:

- IP version: **ipv4**
- Counters: **all**
- Display time: **realtime**

Command Modes Privileged EXEC

| Command History | Release | Modification |
|-----------------|----------|------------------------------|
| | 12.4(9)T | This command was introduced. |

Usage Guidelines Use the **show crypto datapath counters** command to troubleshoot an encrypted data path.



Note Cisco recommends use of this command only for troubleshooting under the guidance of a Cisco TAC engineer.

You must specify the IP version used in the network. You can display all counters, only the counters that have recorded events, or one of these specific counters:

- Error counters track packet processing errors and associated packet drops. When a packet encounters an error, the first 64 bytes of that packet are stored in a buffer, to facilitate troubleshooting.
- Internal counters show the detailed movement of a packet, end to end, across an encrypted data path.
- Punt counters track instances when the configured packet processing method failed, and an alternative method was used. Because such instances might indicate a problem, it is useful to track them.
- Success counters help diagnose network performance problems. Frequently, although a network is configured for fast switching or CEF, packets are using a slower path. Success counters record the interfaces in the data path where packets were successfully processed and reveal the actual processing path.

You must also choose the display timeframe for the counters:

- The **realtime** option captures traffic statistics as they occur, and results in significant discrepancies between the first data reports and later data, because the counters increment with the traffic flow. This is the default option.
- The **snapshot** option captures traffic statistics as of a specific point in time, and results in a close match among all counts, because the counters do not increment with the continuing traffic flow.

Examples

The following example shows output from the **show crypto datapath command**. In this example, the **snapshot** option is specified for the timeframe, and only counters that have recorded events are displayed. The output of this command is intended for use by Cisco TAC engineers.

```
Router# show crypto datapath ipv4 snapshot non-zero

Success Statistics: Snapshot at 21:34:30 PST Mar 4 2006
  crypto check input core
    2nd round ok:          245      1st round ok:          118
  post crypto ip encrypt
    post encrypt ipflowok: 230
  crypto ceal post encrypt switch
    post encrypt ipflowok-2: 230
Error Statistics: Snapshot at 21:34:30 PST Mar 4 2006
Punt Statistics: Snapshot at 21:34:30 PST Mar 4 2006
  crypto ceal post decrypt switch
    fs to ps:            245
Internal Statistics: Snapshot at 21:34:30 PST Mar 4 2006
  crypto check input
    check input core not con 378      check input core consume 623
  crypto check input core
    came back from ce:      245      deny pak:              15
  crypto ipsec les fs
    not esp or ah:         1113
  post crypto ip decrypt
    decrypt switch:        245
  crypto decrypt ipsec sa check
    check ident success:    245
  crypto ceal post decrypt switch
    fs:                     245
  crypto ceal post decrypt fs
    les ip turbo fs:        245      tunnel ip les fs:      245
  crypto ceal post decrypt ps
```

```

proc inline:                245
crypto ceal punt to process inline
  coalesce:                 245    simple enq:        245
crypto ceal post encrypt switch
  ps:                       230
crypto ceal post encrypt ps
  ps coalesce:              230    simple enq:        230
crypto engine ps vec
  ip encrypt:               230
crypto send epa packets
  ucast next hop:          230    ip ps send:        230
    
```

Related Commands

| Command | Description |
|--------------------------|---|
| show monitor event-trace | Displays contents of error history buffers. |

show crypto debug-condition

To display crypto debug conditions that have already been enabled in the router, use the **show crypto debug-condition** command in privileged EXEC mode.

show crypto debug-condition [**peer**] [**connid**] [**spi**] [**fvr**] [**gdoi-group** *groupname*] [**isakmp profile** *profile-name*] [**ivrf**] [**local** *ip-address*] [**unmatched**] [**username** *username*]

Syntax Description

| | |
|---|---|
| peer | (Optional) Displays debug conditions related to the peer. Possible conditions can include peer IP address, subnet mask, hostname, username, and group key. |
| connid | (Optional) Displays debug conditions related to the connection ID. |
| spi | (Optional) Displays debug conditions related to the security parameter index (SPI). |
| fvr | (Optional) Displays debug conditions related to the front-door virtual private network (VPN) routing and forwarding (FVRF) instance. |
| gdoi-group <i>groupname</i> | (Optional) Displays debug conditions related to the Group Domain of Interpretation (GDOI) group filter. <ul style="list-style-type: none"> The <i>groupname</i> value is the name of the GDOI group. |
| isakmp profile <i>profile-name</i> | (Optional) Displays debug conditions related to the Internet Security Association Key Management Protocol (ISAKMP) profile filter. <ul style="list-style-type: none"> The <i>profile-name</i> value is the name of the profile filter. |
| ivrf | (Optional) Displays debug conditions related to the inside VRF (IVRF) instance. |
| local <i>ip-address</i> | (Optional) Displays debug conditions related to the local address debug condition filters. <ul style="list-style-type: none"> The <i>ip-address</i> is the IP address of the local crypto endpoint. |
| unmatched | (Optional) Displays debug messages related to the Internet Key Exchange (IKE), IP Security (IPsec), or the crypto engine, depending on what was specified via the debug crypto condition unmatched [engine gdoi-group] ipsec isakmp] command. |
| username <i>username</i> | (Optional) Displays debug messages related to the AAA Authentication (Xauth) or public key infrastructure (PKI) and authentication, authorization, and accounting (AAA) username filter. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|----------|------------------------------|
| 12.3(2)T | This command was introduced. |

| Release | Modification |
|-------------|--|
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.4(11)T | The gdoi-group <i>groupname</i> , isakmp profile <i>profile-name</i> , local ip-address ,and username <i>username</i> keywords and arguments were added. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines

You can specify as many filter values as specified via the **debug crypto condition** command. (You cannot specify a filter value that you did not use in the **debug crypto condition** command.)

Examples

The following example shows how to display debug messages when the peer IP address is 10.1.1.1, 10.1.1.2, or 10.1.1.3 and when the connection ID 2000 of crypto engine 0 is used. This example also shows how to enable global debug crypto CLIs and enable the **show crypto debug-condition** command to verify conditional settings.

```

Router#
debug crypto condition connid 2000 engine-id 1
Router#
debug crypto condition peer ipv4 10.1.1.1
Router#
debug crypto condition peer ipv4 10.1.1.2
Router#
debug crypto condition peer ipv4 10.1.1.3
Router#
debug crypto condition unmatched
! Verify crypto conditional settings.
Router#
show crypto debug-condition
Crypto conditional debug currently is turned ON
IKE debug context unmatched flag:ON
IPsec debug context unmatched flag:ON
Crypto Engine debug context unmatched flag:ON
IKE peer IP address filters:
10.1.1.1 10.1.1.2 10.1.1.3
Connection-id filters:[connid:engine_id]2000:1,
! Enable global crypto CLIs to start conditional debugging.
Router#
debug crypto isakmp
Router#
debug crypto ipsec
Router#
debug crypto engine

```

The following example shows how to disable all crypto conditional settings via the **reset** keyword:

```

Router#
debug crypto condition reset
! Verify that all crypto conditional settings have been disabled.
Router#
show crypto debug-condition
Crypto conditional debug currently is turned OFF
IKE debug context unmatched flag:OFF

```

```
IPsec debug context unmatched flag:OFF  
Crypto Engine debug context unmatched flag:OFF
```

Related Commands

| Command | Description |
|---|---|
| debug crypto condition | Defines conditional debug filters. |
| debug crypto condition unmatched | Displays crypto conditional debug messages when context information is unavailable to check against debug conditions. |

show crypto dynamic-map

To display a dynamic crypto map set, use the **show crypto dynamic-map** command in EXEC mode.

show crypto dynamic-map [**tag** *map-name*]

Syntax Description

| | |
|----------------------------|--|
| tag <i>map-name</i> | (Optional) Displays only the crypto dynamic map set with the specified <i>map-name</i> . |
|----------------------------|--|

Command Modes

EXEC

Command History

| Release | Modification |
|-------------|---|
| 11.3 T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines

Use the **show crypto dynamic-map** command to view a dynamic crypto map set.

Examples

The following is sample output for the **show crypto dynamic-map** command:

```
Router# show crypto dynamic-map
Crypto Map Template"vpn1" 1
  ISAKMP Profile: vpn1-ra
  No matching address list set.
  Security association lifetime: 4608000 kilobytes/3600 seconds
  PFS (Y/N): N
  Transform sets={
    vpn1,
```

The following partial configuration was in effect when the above **show crypto dynamic-map** command was issued:

```
crypto dynamic-map vpn1 1
 set transform-set vpn1
 set isakmp-profile vpn1-ra
 reverse-route
```

Related Commands

| Command | Description |
|------------------------|-------------------------------------|
| show crypto map | Views the crypto map configuration. |

show crypto eli

To display how many IKE security associations (SAs) and IPsec sessions are active and how many Diffie-Hellman (DH) keys are in use for each hardware crypto engine, use the **show crypto eli** in user EXEC or privileged EXEC mode.

show crypto eli

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 12.1(5)E | This command was introduced. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS release 12.2(33)SXH. |

Usage Guidelines

Use this command to obtain a snapshot of how many Internet Key Exchange (IKE) and IPsec sessions are active and how many DH keys are in use for each hardware crypto engine. The **show crypto eli** command also allows you to see how far an Integrated Service Adapter (ISA) is from reaching its maximum limit. The ELI component of the command calls the Encryption Layer Interface.



Note IKE is a key management protocol standard that is used in conjunction with the IPsec standard. IPsec can be configured without IKE. However, IKE enhances IPsec by providing additional features, flexibility, and ease of configuration for the IPsec standard. When IKE is used with IPsec, IKE automatically negotiates the IPsec SAs.

Examples

The following is sample output for the **show crypto eli** command:

```
Device# show crypto eli

Encryption Layer : ACTIVE
Number of crypto engines = 2.
Slot-3 crypto engine details.
Capability-IPSec :No-IPPCP, 3DES, NoRSA
IKE-Session      :    0 active, 2029 max, 0 failed
DH-Key           :    0 active, 1014 max, 0 failed
IPSec-Session    :    0 active, 4059 max, 0 failed
Slot-5 crypto engine details.
Capability-IPSec :No-IPPCP, 3DES, NoRSA
IKE-Session      :    0 active, 2029 max, 0 failed
DH-Key           :    0 active, 1014 max, 0 failed
IPSec-Session    :    0 active, 4059 max, 0 failed
```


The following is sample output for the **show crypto eli** command for the IPsec VPN SPA:

```
Device# show crypto eli

Hardware Encryption : ACTIVE
Number of hardware crypto engines = 2

CryptoEngine SPA-IPSEC-2G[3/0] details: state = Active
Capability          :
  IPSEC: DES, 3DES, AES, RSA

IKE-Session       :      0 active, 16383 max, 0 failed
DH                :      0 active,  9999 max, 0 failed
IPSec-Session     :      0 active, 65534 max, 0 failed

CryptoEngine SPA-IPSEC-2G[3/1] details: state = Active
Capability          :
  IPSEC: DES, 3DES, AES, RSA

IKE-Session       :      1 active, 16383 max, 0 failed
DH                :      0 active,  9999 max, 0 failed
IPSec-Session     :      2 active, 65534 max, 0 failed
```

The table below describes significant fields shown in the display.

Table 3: show crypto eli summary Field Descriptions

| Field | Description |
|--------|---|
| active | The number of sessions that are active on a given hardware crypto engine. |
| max | The maximum number of sessions allowed for any given IKE, DH, or IPsec entry. |
| failed | The number of times that Cisco IOS software attempted to create more sessions than the number specified in "max." |

show crypto eng qos

To monitor and maintain low latency queuing (LLQ) for IPSec encryption engines, use the show crypto eng qos command in privileged EXEC mode.

show crypto eng qos

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.2(13)T | This command was introduced in Cisco IOS Release 12.2(13)T. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines

Use the **show crypto eng qos** command to determine if QoS is enabled on LLQ for IPSec encryption engines.

Examples

The following example shows how to determine if LLQ for IPSec encryption engines is enabled:

```
Router# show crypto eng qos
crypto engine name: Multi-ISA Using VAM2
  crypto engine type: hardware
    slot: 5
    queuing: enabled
  visible bandwidth: 30000 kbps
  llq size: 0
  default queue size/max: 0/64
  interface table size: 32
  FastEthernet0/0 (3), iftype 1, ctable size 16, input filter:ip
  precedence 5
    class voice (1/3), match ip precedence 5
      bandwidth 500 kbps, max token 100000
      IN match pkt/byte 0/0, police drop 0
      OUT match pkt/byte 0/0, police drop 0
    class default, match pkt/byte 0/0, qdrop 0
  crypto engine bandwidth:total 30000 kbps, allocated 500 kbps
```

The field descriptions in the above display are self-explanatory.

show crypto engine

To display a summary of the configuration information for the crypto engines, use the **show crypto engine** command in privileged EXEC mode.

```
show crypto engine {accelerator {statistic | ring {control | packet | pool}} | brief | configuration |
connections {active | dh | dropped-packet | flow} | qos | token [detail]}
```

| Syntax Description | |
|----------------------|---|
| accelerator | Displays crypto accelerator information. |
| statistic | Displays crypto accelerator statistic information. |
| ring | Displays crypto accelerator ring information. |
| control | Displays control ring information. |
| packet | Displays packet ring information. |
| pool | Displays pool ring information. |
| brief | Displays a summary of the configuration information for the crypto engine. |
| configuration | Displays the version and configuration information for the crypto engine. |
| connections | Displays information about the crypto engine connections. |
| active | Displays all active crypto engine connections. |
| dh | Displays crypto engine Diffie-Hellman table entries. |
| dropped-packet | Displays crypto engine dropped packets. |
| flow | Displays crypto engine flow table entries. |
| qos | Displays quality of service (QoS) information. <ul style="list-style-type: none"> This keyword has a null output if any advanced integration module (AIM) except AIM-VPN/SSL-1 is used. The command-line interface (CLI) will accept the command, but there will be no output. |
| token | Displays the crypto token engine information. |
| detail | (Optional) Displays the detailed information of the crypto token engine. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------|--|
| 11.2 | This command was introduced on the Cisco 7200, RSP7000, and 7500 series routers. |

| Release | Modification |
|--------------------------|---|
| 12.2(15)ZJ | This command was implemented for the AIM-VPN/BPII on the following platforms: Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, and Cisco 2651XM. |
| 12.3(4)T | This command was integrated into Cisco IOS Release 12.3(4)T. |
| 12.4(4)T | IPv6 address information was added to command output. |
| 12.4(9)T | AIM-VPN/SSL-3 encryption module information was added to command output. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(22)T | The token and detail keywords were added. |
| Cisco IOS XE Release 2.2 | This command was integrated into Cisco IOS XE Release 2.2. The accelerator , control , packet , pool , ring , and static keywords were added. |

Usage Guidelines

This command displays all crypto engines and displays the AIM-VPN product name.

If a hardware crypto engine does not support native Group Domain of Interpretation (GDOI) header preservation, the **show crypto engine connections active** output for Group Encrypted Transport VPN (GET VPN) IP security (IPsec) connections displays a disallowed IP address of 0.0.0.0 (see the **show crypto engine connections active**"Examples" section).

Examples

The following is sample output from the **show crypto engine brief** command shows typical crypto engine summary information:

```
Router# show crypto engine brief
crypto engine name: Virtual Private Network (VPN) Module
    crypto engine type: hardware
        State: Enabled
        Location: aim 0
VPN Module in slot: 0
    Product Name: AIM-VPN/SSL-3
    Software Serial #: 55AA
        Device ID: 001F - revision 0000
        Vendor ID: 0000
        Revision No: 0x001F0000
    VSK revision: 0
    Boot version: 255
    DPU version: 0
    HSP version: 3.3(18) (PRODUCTION)
    Time running: 23:39:30
        Compression: Yes
            DES: Yes
            3 DES: Yes
            AES CBC: Yes (128,192,256)
            AES CNTR: No
    Maximum buffer length: 4096
        Maximum DH index: 3500
        Maximum SA index: 3500
```

```

Maximum Flow index: 7000
Maximum RSA key size: 2048
crypto engine name: Cisco VPN Software Implementation
crypto engine type: software
                    serial number: CAD4FCE1
crypto engine state: installed
crypto engine in slot: N/A
    
```

The table below describes the significant fields shown in the display.

Table 4: show crypto engine brief Field Descriptions

| Field | Description |
|-----------------------|---|
| crypto engine name | Name of the crypto engine as assigned with the <i>key-name</i> argument in the crypto key generate dss command. |
| crypto engine type | If "software" is listed, the crypto engine resides in either the Route Switch Processor (RSP) (the Cisco IOS crypto engine) or in a second-generation Versatile Interface Processor (VIP2). If "crypto card" or "Encryption Service Adapter" (ESA) is listed, the crypto engine is associated with an ESA. |
| crypto engine state | The state "installed" indicates that a crypto engine is located in the given slot, but it is not configured for encryption. The state "dss key generated" indicates the crypto engine found in that slot has Digital Signature Standard (DSS) keys already generated. |
| crypto engine in slot | Chassis slot number of the crypto engine. For the Cisco IOS crypto engine, this is the chassis slot number of the RSP. |

The following is sample output from **show crypto engine** command shows IPv6 information:

```

Router# show crypto engine connections
ID Interface Type Algorithm Encrypt Decrypt IP-Address
 1 Et2/0 IPsec MD5 0 46 FE80::A8BB:CCFF:FE01:2C02
 2 Et2/0 IPsec MD5 41 0 FE80::A8BB:CCFF:FE01:2C02
 5 Tu0 IPsec SHA+DES 0 0 3FFE:2002::A8BB:CCFF:FE01:2C02

 6 Tu0 IPsec SHA+DES 0 0 3FFE:2002::A8BB:CCFF:FE01:2C02

1001 Tu0 IKE SHA+DES 0 0 3FFE:2002::A8BB:CCFF:FE01:2C02
    
```

The following **show crypto engine** command output displays information for a situation in which a hardware crypto engine does not support native GDOI:

```

Router# show crypto engine connections active
Crypto Engine Connections
ID Interface Type Algorithm Encrypt Decrypt IP-Address
1079 Se0/0/0.10 IPsec AES+SHA 0 0 0.0.0.0
1080 Se0/0/0.10 IPsec AES+SHA 0 0 0.0.0.0
4364 <none> IKE SHA+3DES 0 0
4381 <none> IKE SHA+3DES 0 0
    
```

Related Commands

| Command | Description |
|---------------------------|---|
| crypto engine accelerator | Enables the use of the onboard hardware accelerator for IPsec encryption. |

show crypto engine accelerator sa-database

To display active (in-use) entries in the platform-specific virtual private network (VPN) module database, use the **show crypto engine accelerator sa-database** command in privileged EXEC mode.

show crypto engine accelerator sa-database

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-----------|---|
| 12.1(1)XC | This command was introduced on the Cisco 1720 and Cisco 1750 platforms. |
| 12.1(2)T | This command was integrated into Cisco IOS Release 12.1(2)T. |

Usage Guidelines

Use this command when encrypted traffic is sent to the router and a problem with the encryption module is suspected.



Note The **show crypto engine accelerator sa-database** command is intended only for Cisco Systems TAC personnel to collect debugging information.

Examples

The following is sample output for the **show crypto engine accelerator sa-database** command:

```
Router# show crypto engine accelerator sa-database
Flow Summary
  Index  Algorithms
  005    tunnel inbound esp-md5-hmac esp-des ah-sha-hmac
  006    tunnel outbound esp-md5-hmac esp-des ah-sha-hmac
  007    tunnel inbound  esp-md5-hmac esp-des ah-sha-hmac
  008    tunnel outbound esp-md5-hmac esp-des ah-sha-hmac
  009    tunnel inbound  esp-md5-hmac esp-des ah-sha-hmac
  010    tunnel outbound esp-md5-hmac esp-des ah-sha-hmac
SA Summary:
  Index  DH-Index      Algorithms
  003    001(deleted)  DES SHA
  004    002(deleted)  DES SHA
DH Summary
  Index Group Config
```

Related Commands

| Command | Description |
|--|--|
| debug crypto engine acclerator logs | Enables logging of commands and associated parameters sent from the VPN module driver to the VPN module hardware using a debug flag. |

show crypto engine accelerator ring

To display the contents and status of the control command, transmit packets, and receive packet rings used by the hardware accelerator crypto engine, use the **show crypto engine accelerator ring** command in privileged EXEC mode.

show crypto engine accelerator ring [{control | packet | pool}]

Syntax Description

| | |
|----------------|---|
| control | (Optional) Number of control commands that are queued for execution by the hardware accelerator crypto engine are displayed. |
| packet | (Optional) Contents and status information for the transmit packet rings that are used by the hardware accelerator crypto engine are displayed. |
| pool | (Optional) Contents and status information for the receive packet rings that are used by the hardware accelerator crypto engine are displayed. |

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|------------|--|
| 12.1(3)XL | This command was introduced for the Cisco uBR905 cable access router. |
| 12.2(2)XA | Support was added for the Cisco uBR925 cable access router. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T and implemented for the AIM-VPN/EPII and AIM-VPN/HPII on the following platforms: Cisco 2691, Cisco 3660, Cisco 3725, and Cisco 3745. |
| 12.2(15)ZJ | This command was implemented for the AIM-VPN/BPII on the following platforms: Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, and Cisco 2651XM. |
| 12.3(4)T | The AIM-VPN/BPII was integrated into Cisco IOS Release 12.3(4)T on the following platforms: Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, and Cisco 2651XM. |

Usage Guidelines

This command displays the command ring information.

If there were valid data in any of the rings, the ring entry would be printed.

Examples

The following example shows the command ring information:

```
Router# show crypto engine accelerator ring packet
PPQ RING:
cmd ring:head = 10 tail =10
result ring:head = 10 tail =10
destination ring:head = 10 tail =10
source ring:head = 10 tail =10
free ring:head = 0 tail =255
      00000000  071A96C5
```



```

00000000 071A96C5
00000001 071A9465
00000001 071A9465
00000002 071A9205
00000002 071A9205
.
.
.

```

| Related Commands | Command | Description |
|------------------|---|--|
| | clear crypto engine accelerator counter | Resets the statistical and error counters for the hardware accelerator to zero. |
| | crypto ca | Defines the parameters for the certification authority used for a session. |
| | crypto cisco | Defines the encryption algorithms and other parameters for a session. |
| | crypto dynamic-map | Creates a dynamic map crypto configuration for a session. |
| | crypto engine accelerator | Enables the use of the onboard hardware accelerator for IPSec encryption. |
| | crypto ipsec | Defines the IPSec SAs and transformation sets. |
| | crypto isakmp | Enables and defines the IKE protocol and its parameters. |
| | crypto key | Generates and exchanges keys for a cryptographic session. |
| | crypto map | Creates and modifies a crypto map for a session. |
| | debug crypto engine accelerator control | Displays each control command as it is given to the crypto engine. |
| | debug crypto engine accelerator packet | Displays information about each packet sent for encryption and decryption. |
| | show crypto engine accelerator sa-database | Displays the active (in-use) entries in the crypto engine SA database. |
| | show crypto engine accelerator statistic | Displays the current run-time statistics and error counters for the crypto engine. |
| | show crypto engine brief | Displays a summary of the configuration information for the crypto engine. |
| | show crypto engine configuration | Displays the version and configuration information for the crypto engine. |
| | show crypto engine connections | Displays a list of the current connections maintained by the crypto engine. |

show crypto engine accelerator logs

To display information about the last 32 CryptoGraphics eXtensions (CGX) Library packet processing commands and associated parameters sent from the VPN module driver to the VPN module hardware, use the **show crypto engine accelerator logs** command in privileged EXEC mode.

show crypto engine accelerator logs

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-----------|---|
| 12.1(1)XC | This command was introduced on the Cisco 1720 and Cisco 1750 platforms. |
| 12.1(2)T | This command was integrated into Cisco IOS Release 12.1(2)T. |

Usage Guidelines

Use this command when encrypted traffic is sent to the router and a problem with the encryption module is suspected. Use the **debug crypto engine accelerator logs** command to enable command logging before using this command.



Note The **show crypto engine accelerator logs** command is intended only for Cisco Systems TAC personnel to collect debugging information.

Examples

The following is sample output for the **show crypto engine accelerator logs** command:

```
Router# show crypto engine accelerator logs
Contents of packet log (current index = 20):
tag = 0x5B02, cmd = 0x5000
param[0] = 0x000E, param[1] = 0x57E8
param[2] = 0x0008, param[3] = 0x0000
param[4] = 0x0078, param[5] = 0x0004
param[6] = 0x142C, param[7] = 0x142C
param[8] = 0x0078, param[9] = 0x000C
tag = 0x5B03, cmd = 0x4100
param[0] = 0x000E, param[1] = 0x583C
param[2] = 0x0034, param[3] = 0x0040
param[4] = 0x00B0, param[5] = 0x0004
param[6] = 0x1400, param[7] = 0x1400
param[8] = 0x0020, param[9] = 0x000C
tag = 0x5C00, cmd = 0x4100
param[0] = 0x000E, param[1] = 0x57BC
param[2] = 0x0034, param[3] = 0x0040
param[4] = 0x00B0, param[5] = 0x0004
param[6] = 0x1400, param[7] = 0x1400
param[8] = 0x0020, param[9] = 0x000C
.
.
.
```

```

tag = 0x5A01, cmd = 0x4100
param[0] = 0x000E, param[1] = 0x593C
param[2] = 0x0034, param[3] = 0x0040
param[4] = 0x00B0, param[5] = 0x0004
param[6] = 0x1400, param[7] = 0x1400
param[8] = 0x0020, param[9] = 0x000C
Contents of cgx log (current index = 12):
cmd = 0x0074 ret = 0x0000
param[0] = 0x0010, param[1] = 0x028E
param[2] = 0x0039, param[3] = 0x0D1E
param[4] = 0x0100, param[5] = 0x0000
param[6] = 0x0000, param[7] = 0x0000
param[8] = 0x0000, param[9] = 0x0000
cmd = 0x0062 ret = 0x0000
param[0] = 0x0035, param[1] = 0x1BE0
param[2] = 0x0100, param[3] = 0x0222
param[4] = 0x0258, param[5] = 0x0000
param[6] = 0x0000, param[7] = 0x0000
param[8] = 0x0000, param[9] = 0x0000
cmd = 0x0063 ret = 0x0000
param[0] = 0x0222, param[1] = 0x0258
param[2] = 0x0000, param[3] = 0x0000
param[4] = 0x0000, param[5] = 0x0000
param[6] = 0x0000, param[7] = 0x020A
param[8] = 0x002D, param[9] = 0x0000
.
.
.
cmd = 0x0065 ret = 0x0000
param[0] = 0x0222, param[1] = 0x0258
param[2] = 0x0010, param[3] = 0x028E
param[4] = 0x00A0, param[5] = 0x0008
param[6] = 0x0001, param[7] = 0x0000
param[8] = 0x0000, param[9] = 0x0000
    
```

Related Commands

| Command | Description |
|--|--|
| debug crypto engine acclerator logs | Enables logging of commands and associated parameters sent from the VPN module driver to the VPN module hardware using a debug flag. |

show crypto engine accelerator statistic

To display IP Security (IPsec) encryption statistics and error counters for the onboard hardware accelerator of a device, the IPsec VPN shared port adapter (SPA) or a Cisco VPN Internal Service Module (ISM), use the **show crypto engine accelerator statistic** command in privileged EXEC mode.

show crypto engine accelerator statistic

Cisco ASR 1000 Series Aggregation Services Routers

show crypto engine accelerator statistic[**{platform}**]

IPsec VPN SPA (SPA-IPSEC-2G) and VSPA (WS-IPSEC-3G)

show crypto engine accelerator statistic[**{slot slot/subslot | all}**] [**{coreutil | detail}**]

Syntax Description

| | |
|--------------------------|--|
| platform | (Optional) Displays platform statistics and information required for debugging. |
| slot slot/subslot | (Optional) Specifies the chassis slot number and secondary slot number on the SPA Interface Processor (SIP), where the SPA is installed. Displays platform statistics for the corresponding SPA. |
| all | (Optional) Displays platform statistics for all IPsec VPN SPAs or VPN Services Port Adapter (VSPA) on the device. |
| coreutil | (Optional) Displays VPN core utilization statistics. |
| detail | (Optional) Displays SPA platform statistics and network interface controller statistics. The controller statistics contain Layer 2 counters. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|------------|--|
| 12.1(1)XC | This command was introduced in the Cisco 1700 Series Modular Access Routers and other Cisco devices that support hardware accelerators for IPsec encryption. |
| 12.1(3)XL | This command was modified. This command was implemented in Cisco uBR905 Cable Access Routers. |
| 12.2(2)XA | This command was modified. Support was added for Cisco uBR925 Cable Access Routers. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T and implemented for the AIM-VPN/EPII and AIM-VPN/HPII on the following platforms: Cisco 2691, Cisco 3660, Cisco 3725, and Cisco 3745. In addition, the output was enhanced to display compression statistics. |
| 12.2(15)ZJ | This command was modified. This command was implemented for the AIM-VPN/BPII on the following platforms: Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, and Cisco 2651XM. |

| Release | Modification |
|---------------------------|---|
| 12.3(4)T | The AIM-VPN/BPII was integrated into Cisco IOS Release 12.3(4)T on the following platforms: Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, and Cisco 2651XM. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA to support the IPsec VPN SPA on Cisco 7600 Series Routers. |
| 12.4(9)T | This command was modified. Output was added for the AIM-VPN Secure Sockets Layer (SSL) encryption module. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH to support the IPsec VPN SPA on Cisco Catalyst 6500 Series Switches. |
| 12.2(33)SXI | This command was modified. The coreutil keyword was added for VSPA, and the output was added to display the percentage utilization with other utilization statistics in the crypto engine. |
| 12.4(24)T | This command was modified. The output was enhanced to display reassembly and fragmentation drop counters for VPN Service Adapter (VSA) traffic statistics. |
| Cisco IOS XE Release 3.7S | This command was integrated into Cisco IOS XE Release 3.7S. The platform keyword was added. The output was also enhanced to display platform statistics and debugging information for the crypto engine. |
| 15.3(2)T | This command was modified. The output of this command was enhanced to display statistical information about the Cisco VPN ISM. |
| Cisco IOS XE Fuji 16.8.1 | Supported added for Cisco ISR4300 Series platforms. |

Usage Guidelines

No specific usage guidelines apply to hardware accelerators.

The **show crypto engine accelerator statistic platform** command displays the output from a series of **show** commands. The specific commands depend on the platform on which the command is executed. This is indicated in the command output.



Note Refer to the appropriate hardware manual for slot information. For SIPs, refer to the platform-specific *SPA Hardware Installation Guide* or the corresponding “Identifying Slots and Subslots for SIPs and SPAs” module in the platform-specific *SPA Software Configuration Guide*.

IPsec VPN SPA and VSPA

Use the **slot** keyword to display platform statistics for the corresponding SPA. The output with this keyword will not include network interface controller statistics.

Use the **all** keyword to display platform statistics for all IPsec VPN SPAs and VSPAs on the device. The output with this keyword will not include network interface controller statistics.

Use the **detail** keyword to display platform statistics for the SPA and network interface controller statistics. The controller statistics contain Layer 2 counters.

VSPA

Use the **coreutil** keyword to display VPN core utilization statistics. The output with this keyword will not include network interface controller statistics.



Tip You can add a time stamp to **show** commands by using the **exec prompt timestamp** command in line configuration mode.

Examples

Hardware VPN Module

The following example displays compression statistics for an onboard hardware accelerator of a device:

```
Device# show crypto engine accelerator statistic

Device:    AIM-VPN/SSL-3
Location:  AIM Slot: 0
Virtual Private Network (VPN) Module in slot : 0
Statistics for Hardware VPN Module since the last clear of counters 85319 seconds ago
    560 packets in                560 packets out
  95600 bytes in                 124720 bytes out
    0 paks/sec in                0 paks/sec out
    0 Kbits/sec in               0 Kbits/sec out
    0 packets decrypted          560 packets encrypted
    0 bytes before decrypt       124720 bytes encrypted
    0 bytes decrypted            95600 bytes after encrypt
    0 packets decompressed       0 packets compressed
    0 bytes before decomp        0 bytes before comp
    0 bytes after decomp         0 bytes after comp
    0 packets bypass decompr     0 packets bypass compress
    0 bytes bypass decompress    0 bytes bypass compressi
    0 packets not decompress     0 packets not compressed
    0 bytes not decompressed     0 bytes not compressed
    1.0:1 compression ratio     1.0:1 overall
  10426 commands out            10426 commands acknowledged

Last 5 minutes:
    0 packets in                0 packets out
    0 paks/sec in               0 paks/sec out
    0 bits/sec in               0 bits/sec out
    0 bytes decrypted           0 bytes encrypted
    0 Kbits/sec decrypted       0 Kbits/sec encrypted
    1.0:1 compression ratio     1.0:1 overall

Errors:
  ppq full errors      :      0  ppq rx errors      :      0
  cmdq full errors    :      0  cmdq rx errors    :      0
  ppq down errors     :      0  cmdq down errors  :      0
  no buffer           :      0  replay errors     :      0
  dest overflow       :      0  authentication errors :      0
  Other error         :      0  Raw Input Underrun :      0
  IPSEC Unsupported Option: 0  IPV4 Header Length :      0
  ESP Pad Length      :      0  IPSEC Decompression :      0
  AH ESP seq mismatch :      0  AH Header Length    :      0
  AH ICV Incorrect    :      0  IPCOMP CPI Mismatch :      0
  IPSEC ESP Modulo    :      0  Unexpected IPV6 Extension: 0
  Unexpected Protocol :      0  Dest Buf overflow   :      0
  IPSEC Pkt is fragment : 0  IPSEC Pkt src count :      0
  Invalid IP Version  :      0  Unwrappable         :      0
  SSL Output overrun  :      0  SSL Decompress failure :      0
  SSL BAD Decomp History : 0  SSL Version Mismatch :      0
```

```

SSL Input overrun      :      0  SSL Conn Modulo      :      0
SSL Input Underrun    :      0  SSL Connection closed :      0
SSL Unrecognised content: 0  SSL record header length : 0
PPTP Duplicate packet :      0  PPTP Exceed max missed p : 0
RNG self test fail   :      0  DF Bit set              :      0
Hash Miscompare      :      0  Unwrappable object     :      0
Missing attribute    :      0  Invalid attribute value :      0
Bad Attribute        :      0  Verification Fail      :      0
Decrypt Failure      :      0  Invalid Packet         :      0
Invalid Key          :      0  Input Overrun          :      0
Input Underrun       :      0  Output buffer overrun  :      0
Bad handle value     :      0  Invalid parameter      :      0
Bad function code    :      0  Out of handles         :      0
Access denied        :      0  Out of memory          :      0
NR overflow          :      0  pkts dropped           :      0
Warnings:
sessions_expired     :      0  packets_fragmented    :      0
general:              :      0
HSP details:
hsp_operations       :    10441  hsp_session
    
```

The following table describes the significant fields shown in the display.

Table 5: show crypto engine accelerator statistic Field Descriptions

| Field | Description |
|------------------------|---|
| packets decompressed | Packets that were decompressed by the interface. |
| packets compressed | Packets that were compressed by the interface. |
| bytes before decomp | Compressed bytes that were presented to the compression algorithm from the input interface on decryption. |
| bytes before comp | Uncompressed bytes (payload) that were presented to the compression algorithm from Cisco software on encryption. |
| bytes after decomp | Decompressed bytes that were sent to Cisco software by the compression algorithm on decryption. |
| bytes after comp | Compressed bytes that were forwarded to Cisco software by the algorithm on encryption. |
| packets bypass compres | Packets that were not compressed because they were too small (less than 128 bytes). |
| packets not compressed | Packets that were not compressed because the packets were expanded rather than compressed. |
| compression ratio | Ratio of compression and decompression of packets presented to the compression algorithm that were successfully compressed or decompressed. This statistic measures the efficiency of the algorithm for all packets that were compressed or decompressed. |

| Field | Description |
|---------|--|
| overall | Ratio of compression and decompression of packets presented to the compression algorithm, including packets that were not compressed because they were expanded or very small in size. This ratio indicates whether data traffic on this interface is suitable for compression. A ratio of 1:1 would imply that no successful compression is being performed on this data traffic. |

Cisco 7200 Router with VSA

The following is sample output from a Cisco 7200 router with a VSA:

```

Device# show crypto engine accelerator statistic 1/0

Inbound rate: 0pps 0kb/s  Outbound rate: 0pps 0kb/s
  TRAFFIC                Transmitted                Received
-----
Message Count:                5                            5
Message Byte Count:           1212                         256
Message Overflow:              0
Outbound Count:                54                           154
Outbound Byte Count:          12472                        30332
Outbound Overflow:            0
Inbound Count:                 153                          153
Inbound Byte Count:           26304                        19864
Inbound Overflow:              0
Reassembled Pkt:              0
Fragments Dropped:            0
  IPPE:                        0
  EPPE:                        0
  FIFO:                        0
  RAE:                          0
Inbound Traffic:
-----
Decrypted Pkt:                 150
Passthrough Pkt:               3
IKE Pkt:                       0
SPI Error:                     0
Policy Violation:              0
Outbound Traffic:              Route cache                Processor
-----
Encrypted Pkt:                 150                            0
Passthrough Pkt:               0                             4
Policy Violation:              0
Queue Depth:
-----
TXRing Current Queue Depth:
  High Priority :                0.0 %
  Medium Priority :              0.0 %
  Low Priority :                  0.0 %
VSA RX Exception statistics:
  Invalid SA :                   0  Enc Dec mismatch :           0
  Next Header mismatch :         0  Pad mismatch :           0
  MAC mismatch :                 0  Anti replay failed :        0
  Enc Seq num overflow :         0  Dec IPver mismatch :        0
  Enc IPver mismatch :           0  TTL Decr :                 0
  Selector checks :              0  UDP mismatch :             0
  IP Parse error :               0  Fragmentation Error :       0
  IB Selector check :            0  TimeBased Replay Err :      0
  Misc. Exceptions :             0

```


The following table describes the significant fields shown in the display.

Table 6: show crypto engine accelerator statistic Field Descriptions for a Cisco 7200 Router with the VSA

| Field | Description |
|---------------------|---|
| Message Count | Number of messages sent to the VSA. |
| Message Byte Count | Byte count for messages. |
| Message Overflow | Number of messages that could not be sent because there was no space in the transmission ring. |
| Outbound Count | Number of outbound packets sent to the VSA either for classification, encryption, or both (includes packets for encryption or passthrough). |
| Outbound Byte Count | Byte count of packets. |
| Outbound Overflow | Number of outbound packets that could not be sent. |
| Inbound Count | Number of inbound packets sent to the VSA either for classification, decryption, or both. |
| Inbound Byte Count | Byte count for packets. |
| Inbound Overflow | Number of inbound packets that could not be sent because the transmission ring was full. |
| Reassembled Pkt | Number of reassembled packets. |
| Fragments Dropped | Number of fragments dropped. |
| IPPE | Number of inbound fragments dropped by the Ingress Packet Processing Engine (IPPE). |
| EPPE | Number of outbound fragments dropped by the Egress Packet Processing Engine (EPPE). |
| FIFO | Number of fragments dropped by the FIFO fragment queue. |
| RAE | Number of fragments dropped by the Reassembly Engine (RAE). |
| Inbound Traffic | Inbound fragments. |
| Decrypted Pkt | Number of decrypted packets. |
| Passthrough Pkt | Number of clear packets in the inbound direction. |
| IKE Pkt | Number of Internet Key Exchange (IKE) packets that were received. |
| SPI Error | Number of received packets that have an invalid security parameter index (SPI). |

| Field | Description |
|-----------------------------|--|
| Policy Violation | Number of clear packets that the VSA received that should have come encrypted as per the policy. |
| Outbound Traffic | Outbound fragments. |
| Encrypted Pkt | Number of encrypted packets. |
| Passthrough Pkt | Number of outbound clear packets. |
| Policy Violation | Number outbound security association (SA) to encrypt the packet. |
| Queue Depth | Number of packets in queue. |
| TXRing Current Queue Depth | Current queue depth of the three transmitting rings, which are High, Medium, and Low Priority. |
| VSA RX Exception statistics | Errors from the crypto chip. |
| Invalid SA | Specified SA does not exist. |
| Enc Dec mismatch | Packet on the wrong SA type. |
| Next Header mismatch | Wrong next header field found in the packet. |
| Pad mismatch | Wrong pad found in the packet. |
| MAC mismatch | Authentication check failed. |
| Anti replay failed | Antireplay error. |
| Enc Seq num overflow | Sequence number reached the maximum specified for the SA. |
| Dec IPver mismatch | Wrong IP version for the packet to be decrypted. For example, an IPv4 packet came in for an IPv6 SA. |
| Enc IPver mismatch | Wrong IP version for the packet to be encrypted. |
| TTL Decr | Time to Live (TTL) decremented to 0 (zero). |
| Selector checks | Decrypted packet failed the policy check. |
| UDP mismatch | UDP packet failed the sanity check. |
| IP Parse error | Error in IP packet parsing. |
| Fragmentation Error | Could not fragment; Don't Fragment (DF) bit set. |
| IB Selector check | Decrypted packet failed the policy check (for Group Encrypted Transport VPN (GET VPN)). |
| TimeBased Replay Err | Time-based anti-replay failed for GET VPN. |

| Field | Description |
|------------------|--|
| Misc. Exceptions | Errors not classified as any of the above. |

IPsec VPN SPA and VSPA

The following example shows platform statistics for the IPsec VPN SPA in slot 1 subslot 0 and also displays network interface controller statistics (this sample output is from a Catalyst 6500 Series Switch installed with IPsec VPN SPA):

Device# **show crypto engine accelerator statistic slot 1/0 detail**

```

1/0 detail
VPN module in slot 1/0
Decryption Side Data Path Statistics
=====
Packets RX.....: 454260
Packets TX.....: 452480
IPSec Transport Mode.....: 0
IPSec Tunnel Mode.....: 452470
AH Packets.....: 0
ESP Packets.....: 452470
GRE Decapsulations.....: 0
NAT-T Decapsulations.....: 0
Clear.....: 8
ICMP.....: 0
Packets Drop.....: 193
Authentication Errors.....: 0
Decryption Errors.....: 0
Replay Check Failed.....: 0
Policy Check Failed.....: 0
Illegal Clear Packet.....: 0
GRE Errors.....: 0
SPD Errors.....: 0
HA Standby Drop.....: 0
Hard Life Drop.....: 0
Invalid SA.....: 191
SPI No Match.....: 0
Destination No Match.....: 0
Protocol No Match.....: 0
Reassembly Frag RX.....: 0
IPSec Fragments.....: 0
IPSec Reasm Done.....: 0
Clear Fragments.....: 0
Clear Reasm Done.....: 0
Datagrams Drop.....: 0
Fragments Drop.....: 0
Decryption Side Controller Statistics
=====
Frames RX.....: 756088
Bytes RX.....: 63535848
Mcast/Bcast Frames RX.....: 2341
RX Less 128Bytes.....: 756025
RX Less 512Bytes.....: 58
RX Less 1KBytes.....: 2
RX Less 9KBytes.....: 3
RX Frames Drop.....: 0
Frames TX.....: 452365
Bytes TX.....: 38001544
Mcast/Bcast Frames TX.....: 9
TX Less 128Bytes.....: 452343
TX Less 512Bytes.....: 22
    
```

show crypto engine accelerator statistic

```

TX Less 1KBytes.....: 0
TX Less 9KBytes.....: 0
Encryption Side Data Path Statistics
=====
Packets RX.....: 756344
Packets TX.....: 753880
IPSec Transport Mode.....: 0
IPSec Tunnel Mode.....: 753869
GRE Encapsulations.....: 0
NAT-T Encapsulations.....: 0
LAF prefragmented.....: 0
Fragmented.....: 0
Clear.....: 753904
ICMP.....: 0
Packets Drop.....: 123
IKE/TED Drop.....: 27
Authentication Errors.....: 0
Encryption Errors.....: 0
HA Standby Drop.....: 0
Hard Life Drop.....: 0
Invalid SA.....: 191
Reassembly Frag RX.....: 0
Clear Fragments.....: 0
Clear Reasm Done.....: 0
Datagrams Drop.....: 0
Fragments Drop.....: 0
Encryption Side Controller Statistics
=====
Frames RX.....: 454065
Bytes RX.....: 6168274
Mcast/Bcast Frames RX.....: 1586
RX Less 128Bytes.....: 1562
RX Less 512Bytes.....: 452503
RX Less 1KBytes.....: 0
RX Less 9KBytes.....: 0
RX Frames Drop.....: 0
Frames TX.....: 753558
Bytes TX.....: 100977246
Mcast/Bcast Frames TX.....: 2
TX Less 128Bytes.....: 3
TX Less 512Bytes.....: 753555
TX Less 1KBytes.....: 0
TX Less 9KBytes.....: 0

```

The following table describes the significant fields shown in the display.

Table 7: show crypto engine accelerator statistic Field Descriptions for IPsec VPN SPA Statistics

| Field | Description |
|--------------------------------------|---|
| Decryption Side Data Path Statistics | Information about packets received on the decryption side of IPsec VPN SPA. |
| Packets RX | Number of packets received on the decryption side of IPsec VPN SPA. |
| Packets TX | Number of packets transmitted by IPsec VPN SPA in the decryption direction. |
| IPSec Transport Mode | Number of packets in IPsec Transport Mode. |

| Field | Description |
|-----------------------|---|
| IPSec Tunnel Mode | Number of packets in IPSec Tunnel Mode. |
| AH Packets | Number of packets with Authentication Headers (AHs). |
| ESP Packets | Number of packets with Encapsulating Security Payload (ESP) headers. |
| GRE Decapsulations | Number of packets that were generic routing encapsulation (GRE) decapsulated. |
| NAT-T Decapsulations | Number of packets that were Network Address Translation-Traversal (NAT-T) decapsulated. |
| Clear | Number of clear packets received. |
| ICMP | Number of Internet Control Message Protocol (ICMP) packets received. |
| Packets Drop | <p>Number of packets dropped.</p> <p>Note This does not represent the sum of the individual drop subtotals displayed (does not include bridge protocol data unit (BPDU), Cisco Discovery Protocol, or Maintenance Operation Protocol (MOP) packets drops).</p> |
| Authentication Errors | Number of authentication errors. |
| Decryption Errors | Number of decryption errors. |
| Replay Check Failed | Number of replay check errors. |
| Policy Check Failed | Number of policy check errors. |
| Illegal Clear Packet | Number of illegal clear packets. |

| Field | Description |
|----------------------|--|
| GRE Errors | <p>Number of GRE errors due to invalid packets or invalid SAs.</p> <p>Note These errors correspond to the sum of the following GRE errors in the output from the show stats icpu command: “GRE Packet Errors,” “GRE SA No Match,” and “Invalid GRE SA.” These errors include the number of GRE packets that are RFC compliant but use a format not supported by the VPN module, the number of GRE packets in which the SA lookup results is a no match, and the number of GRE packets in which the SA lookup matches an entry marked as invalid.</p> |
| SPD Errors | <p>Number of security policy database (SPD) errors.</p> <p>Note These errors correspond to the sum of the following SPD errors in the output from the show stats icpu command: “SPD Lookup Failed,” “SPD Invalid,” and “SPD ID No Match.”</p> |
| HA Standby Drop | <p>Number of packet drops on a High Availability (HA) standby IPsec VPN SPA.</p> <p>Note The standby IPsec VPN SA is not supposed to receive packets.</p> |
| Hard Life Drop | <p>Number of packet drops due to SA hard life expiration.</p> <p>Note These packets are dropped during rekeying after the SA volume lifetime has been reached.</p> |
| Invalid SA | Number of packet drops due to an invalid SA. |
| SPI No Match | Number of packet drops due to a Security Parameter Index (SPI) mismatch. |
| Destination No Match | Number of packet drops due to an error in matching the destination. |
| Protocol No Match | Number of packet drops due to an error in matching the protocol. |
| Reassembly Frag RX | Number of packets that required reassembly during processing. |
| IPsec Fragments | Number of IPsec fragments. |

| Field | Description |
|---------------------------------------|--|
| IPsec Reasm Done | Number of IPsec fragments reassembled. |
| Clear Fragments | Number of clear fragments. |
| Clear Reasm Done | Number of clear fragments reassembled. |
| Datagrams Drop | Number of reassembled datagrams that were dropped. |
| Fragments Drop | Number of fragments that were dropped. |
| Decryption Side Controller Statistics | Information about packets received on the decryption side controller. |
| Frames RX | Number of frames received. |
| Bytes RX | Number of bytes received. |
| Mcast/Bcast Frames RX | Number of multicast or broadcast frames received. |
| RX Less 128Bytes | Number of frames less than 128 bytes in size. |
| RX Less 512Bytes | Number of frames greater than or equal to 128 bytes and less than 512 bytes in size. |
| RX Less 1KBytes | Number of frames greater than or equal to 512 bytes and less than 1 kilobyte (KB) in size. |
| RX Less 9KBytes | Number of frames greater than or equal to 1 KB and less than 9 KB in size. |
| RX Frames Drop | Number of frames dropped. |
| Frames TX | Number of frames transmitted. |
| Bytes TX | Number of bytes transmitted. |
| Mcast/Bcast Frames TX | Number of multicast or broadcast frames transmitted. |
| TX Less 128Bytes | Number of frames less than 128 bytes in size. |
| TX Less 512Bytes | Number of frames greater than or equal to 128 bytes and less than 512 bytes in size. |
| TX Less 1KBytes | Number of frames greater than or equal to 512 bytes and less than 1 KB in size. |
| TX Less 9KBytes | Number of frames greater than or equal to 1 KB and less than 9 KBs in size. |
| Encryption Side Data Path Statistics | Information about packets received on the encryption side of IPsec VPN SPA. |
| Packets RX | Number of packets received on the encryption side of the IPsec VPN SPA. |

| Field | Description |
|-----------------------|--|
| Packets TX | Number of packets transmitted by the IPsec VPN SPA in the encryption direction. |
| IPsec Transport Mode | Number of packets in IPsec Transport Mode. |
| IPsec Tunnel Mode | Number of packets in IPsec Tunnel Mode. |
| GRE Encapsulations | Number of packets that were GRE encapsulated. |
| NAT-T Encapsulations | Number of packets that were NAT-T encapsulated. |
| LAF prefragmented | Number of packets with prefragmented look-ahead fragmentation (LAF) set. |
| Fragmented | Number of packets fragmented. |
| Clear | Number of clear packets. |
| ICMP | Number of ICMP packets. |
| Packets Drop | Number of packet drops. Note This does not represent the sum of the individual drop subtotals displayed (does not include BPDU, Cisco Discovery Protocol, or MOP packets drops). |
| IKE/TED Drop | Number of packet drops because the SA has not been set up. |
| Authentication Errors | Number of authentication errors. |
| Encryption Errors | Number of encryption errors. |
| HA Standby Drop | Number of packet drops on an HA standby IPsec VPN SPA. Note The standby IPsec VPN SPA is not supposed to receive packets. |
| Hard Life Drop | Number of packet drops due to SA hard-life expiration. Note These packets are dropped during rekeying after the SA volume lifetime has been reached. |
| Invalid SA | Number of packet drops due to an invalid SA. |
| Reassembly Frag RX | Number of packets that required reassembly processing. |
| Clear Fragments | Number of clear fragments. |

| Field | Description |
|---------------------------------------|--|
| Clear Reasm Done | Number of clear fragments reassembled. |
| Datagrams Drop | Number of reassembled datagrams dropped. |
| Fragments Drop | Number of fragments dropped. |
| Encryption Side Controller Statistics | Information about packets received on the decryption side controller. |
| Frames RX | Number of frames received. |
| Bytes RX | Number of bytes received. |
| Mcast/Bcast Frames RX | Number of multicast or broadcast frames received. |
| RX Less 128Bytes | Number of frames less than 128 bytes in size. |
| RX Less 512Bytes | Number of frames greater than or equal to 128 bytes and less than 512 bytes in size. |
| RX Less 1KBytes | Number of frames greater than or equal to 512 bytes and less than 1 KB in size. |
| RX Less 9KBytes | Number of frames greater than or equal to 1 KB and less than 9 KB in size. |
| RX Frames Drop | Number of frames dropped. |
| Frames TX | Number of frames transmitted. |
| Bytes TX | Number of bytes transmitted. |
| Mcast/Bcast Frames TX | Number of multicast or broadcast frames transmitted. |
| TX Less 128Bytes | Number of frames less than 128 bytes in size. |
| TX Less 512Bytes | Number of frames greater than or equal to 128 bytes and less than 512 bytes in size. |
| TX Less 1KBytes | Number of frames greater than or equal to 512 bytes and less than 1 KB in size. |
| TX Less 9KBytes | Number of frames greater than or equal to 1 KB and less than 9 KB in size. |

VSPA

The following is sample output when the **coreutil** keyword is used with the VSPA and Cisco Catalyst 6500 Series Switches that use Cisco IOS Release 12.2(33)SXI and later releases:

```
Device# show crypto engine accelerator statistic slot 2/0 coreutil
```

```
Utilization Percentages for VPN blade in slot 2/0
Blade Utilization Percentages
```

```

=====
Last 5 seconds -----
Slowpath ..... 35 %
Inbound ..... 24 %
Outbound ..... 32 %
QoS ..... 44 %
Last 1 minute -----
Slowpath ..... 12 %
Inbound ..... 11 %
Outbound ..... 15 %
QoS ..... 23 %
Last 5 minutes -----
Slowpath ..... 8 %
Inbound ..... 11 %
Outbound ..... 11 %
QoS ..... 10 %
    
```

Device# **show crypto engine accelerator statistic all coreutil**

Utilization Percentages for VPN blade in slot 2/0
Blade Utilization Percentages

```

=====
Last 5 seconds -----
Slowpath ..... 35 %
Inbound ..... 24 %
Outbound ..... 32 %
QoS ..... 44 %
Last 1 minute -----
Slowpath ..... 12 %
Inbound ..... 11 %
Outbound ..... 15 %
QoS ..... 23 %
Last 5 minutes -----
Slowpath ..... 8 %
Inbound ..... 11 %
Outbound ..... 11 %
QoS ..... 10 %
    
```

Utilization Percentages for VPN blade in slot 2/1
Blade Utilization Percentages

```

=====
Last 5 seconds -----
Slowpath ..... 88 %
Inbound ..... 78 %
Outbound ..... 79 %
QoS ..... 32 %
Last 1 minute -----
Slowpath ..... 76 %
Inbound ..... 80 %
Outbound ..... 80 %
QoS ..... 13 %
Last 5 minutes -----
Slowpath ..... 75 %
Inbound ..... 65 %
Outbound ..... 70 %
QoS ..... 12 %
    
```

The following table describes the significant fields shown in the display.

Table 8: show crypto engine accelerator statistic coreutil Field Descriptions

| Field | Description |
|----------|---|
| Slowpath | Utilization of slowpath traffic capacity. |

| Field | Description |
|----------|---|
| Inbound | Utilization of inbound traffic capacity. |
| Outbound | Utilization of outbound traffic capacity. |
| QoS | Utilization of quality of service (QoS) traffic capacity. |

Related Commands

| Command | Description |
|---|--|
| clear crypto engine accelerator counter | Resets statistical error counters for the hardware accelerator. |
| crypto ca | Defines parameters for the certification authority. |
| crypto cisco | Defines encryption algorithms and other parameters. |
| crypto dynamic-map | Creates a dynamic map crypto configuration. |
| crypto engine accelerator | Enables the use of the onboard hardware accelerator of the Cisco uBR905 and Cisco uBR925 routers for IPsec encryption. |
| crypto ipsec | Defines IPsec SAs and transformation sets. |
| crypto isakmp | Enables and defines the IKE protocol. |
| crypto key | Generates and exchanges keys for a cryptographic session. |
| crypto map | Creates and modifies a crypto map for a session. |
| debug crypto engine accelerator control | Displays each control command as sent to the crypto engine. |
| debug crypto engine accelerator packet | Displays information about each packet sent for encryption and decryption. |
| show crypto engine accelerator ring | Displays the contents of command and transmit rings for the crypto engine. |
| show crypto engine accelerator sa-database | Displays the active (in-use) entries in the crypto engine SA database. |
| show crypto engine brief | Displays a summary of the configuration information for the crypto engine. |
| show crypto engine configuration | Displays the version and configuration information for the crypto engine. |
| show crypto engine connections | Displays a list of the current connections maintained by the crypto engine. |

show crypto gdoi

To display information about a Group Domain of Interpretation (GDOI) configuration, use the **show crypto gdoi** command in privileged EXEC mode.

```
show crypto gdoi [debug-condition
| [[group group-name] [{feature {gm-removal|policy-replace|gdoi-mib|
ipv6-crypto-path|suite-b|cts-sgt|long-sa-lifetime}|gm [{acl [{download|
local}}]|identifier [detail]|pubkey|rekey sa [detail]|replay}}]|ks [{acl|coop
[identifier [detail] | version]|identifier [detail]|members [ip-address]|policy
|rekey|replay}}]|ipsec sa}}]]
```

Syntax Description

| | |
|-------------------------------------|---|
| debug-condition | (Optional) Displays GDOI debug conditional filters. |
| group <i>group-name</i> | (Optional) Displays information about the group specified. |
| feature | (Optional) Displays the version of the GET VPN software running on each key server (KS) and group member (GM) in the GET VPN network and displays whether each device is running a version that supports the specified feature. |
| gm-removal | (Optional) Displays whether GM removal is supported. |
| policy-replace | (Optional) Displays whether the rekeying and policy replacement feature is supported. |
| gdoi-mib | (Optional) Displays whether the GDOI MIB is supported. |
| ipv6-crypto-path | (Optional) Displays whether devices in the GET VPN network support IPv6 encryption and decryption (and thus can be added to an IPv6 group). |
| suite-b | (Optional) Displays whether Suite B cryptography is supported. |
| cts-sgt | (Optional) Displays whether IPsec inline tagging for Cisco TrustSec is supported. |
| long-sa-lifetime | (Optional) Displays whether long security association (SA) lifetimes are supported. |
| gm | (Optional) Displays information about GMs. This keyword must be entered on a GM. |
| acl | (Optional) Displays the access control list (ACL) that has been applied to the GDOI group. |
| download | (Optional) Displays the ACL downloaded from the KS. |
| local | (Optional) Displays the locally-configured ACL. |
| identifier [detail] | (Optional) Displays Suite B sender identifier (SID) information. The detail keyword displays detailed information. |
| pubkey | (Optional) Displays public keys downloaded from the KS. |
| rekey sa [detail] | (Optional) Displays all existing GDOI rekey security associations (SAs), whether in an active or standby state. The detail keyword displays detailed information. |
| replay | (Optional) Displays group information for time-based anti-replay. |

| | |
|----------------------------------|--|
| ks | (Optional) Displays information about KSs. This keyword must be entered on a KS. |
| coop | (Optional) Displays information about the cooperative KSs. |
| version | (Optional) Displays information about the cooperative KS and client versions. |
| members <i>ip-address</i> | (Optional) Displays information about registered GMs. You can specify the IPv4 address of a specific GM. |
| policy | (Optional) Displays KS policy information. |
| ipsec sa | (Optional) Displays information about the IP security (IPsec) security associations (SAs) for all GMs. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|---|
| 12.4(6)T | This command was introduced. |
| 12.4(11)T | This command was modified. The group <i>group-name</i> keyword and argument combination and the gm , acl , rekey , replay , ks , coop [version], members , policy , and ipsec sa keywords were added. |
| Cisco IOS XE Release 2.3 | This command was integrated into Cisco IOS XE Release 2.3. |
| 15.1(3)T | This command was modified. The debug-condition keyword was added. |
| 15.2(1)T | This command was modified. The feature , gm-removal , policy-replace , and gdoi-mib keywords were added. |
| 15.2(3)T | This command was modified. Output was added that displays information about whether the GET VPN data plane is in IPv4 or IPv6 (whether there are group policies defined in IPv4 or IPv6) and whether the control paths for groups are in IPv4 or IPv6), and the ipv6-crypto-path keyword was added. |
| 15.2(4)M | This command was modified. The suite-b keyword was added, and the identifier and detail keyword combination for Suite B cryptography was added. |
| Cisco IOS XE Release 3.8S | This command was modified. The feature , gm-removal , policy-replace , and gdoi-mib keywords were added. |

| Release | Modification |
|----------------------------|---|
| 15.3(2)T | <p>This command was modified. The cts-sgt and long-sa-lifetime keywords were added.</p> <p>The output was enhanced for the following forms of the command:</p> <ul style="list-style-type: none"> • show crypto gdoi: Shows the traffic encryption keys (TEKs) that a GM last received from the KS and shows the time until the next rekey. • show crypto gdoi gm replay: Shows information about the last 50 time-based antireplay errors. • show crypto gdoi ks rekey: Shows the number of rekey retransmissions, the current retransmit period, and the time until the next retransmission. • show crypto gdoi ks policy: Shows the time until the next rekey. |
| Cisco IOS XE Release 3.9S | This command was integrated into Cisco IOS XE Release 3.9S. |
| Cisco IOS XE Release 3.11S | This command was modified. The rekey keyword was renamed to rekey sa . |

Usage Guidelines

Because the **show running-config** command does not display enabled **debug** commands, the **debug-condition** keyword is useful for displaying GDOI debug conditional filters that are enabled.

Examples

The following example shows how to display GET VPN group information for all groups. In this example, the command was entered on a KS:

```
Device# show crypto gdoi
GROUP INFORMATION

  Group Name           : GETV6 (Unicast)
  Group Identity       : 1111
  Crypto Path          : ipv6
  Key Management Path  : ipv4
  Group Members        : 2
  IPSec SA Direction  : Both
  Redundancy           : Configured
    Local Address      : 192.0.2.1
    Local Priority      : 100
    Local KS Status    : Alive
    Local KS Role      : Primary
    Local KS Version   : 1.0.4
  Group Rekey Lifetime : 86400 secs
  Group Rekey
    Remaining Lifetime : 86127 secs
  Rekey Retransmit Period : 10 secs
  Rekey Retransmit Attempts: 2
  Group Retransmit
    Remaining Lifetime : 0 secs

  IPSec SA Number      : 1
  IPSec SA Rekey Lifetime: 3600 secs
  Profile Name         : IPSEC_PROF_GETV6
```

```

Replay method          : Time Based
Replay Window Size     : 10
SA Rekey
  Remaining Lifetime    : 3328 secs
ACL Configured         : access-list ACL_GETV6_MIX

Group Server list      : Local

```

GROUP INFORMATION

```

Group Name              : GETV4 (Unicast)
Group Identity          : 2222
Crypto Path             : ipv4
Key Management Path     : ipv4
Group Members           : 2
IPSec SA Direction     : Both
Redundancy              : Configured
  Local Address         : 192.0.2.1
  Local Priority        : 90
  Local KS Status       : Alive
  Local KS Role         : Secondary
  Local KS Version      : 1.0.4
Group Rekey Lifetime    : 86400 secs
Group Rekey
  Remaining Lifetime    : 86127 secs
Rekey Retransmit Period : 10 secs
Rekey Retransmit Attempts: 2
Group Retransmit
  Remaining Lifetime    : 0 secs

IPSec SA Number        : 1
IPSec SA Rekey Lifetime: 3600 secs
Profile Name           : IPSEC_PROF_GETV6
Replay method          : Count Based
Replay Window Size     : 64
SA Rekey
  Remaining Lifetime    : 3328 secs
ACL Configured         : access-list ACL_GETV4_HOST

Group Server list      : Local

```

The following example shows how to enter the command on a GM to display GET VPN group information for all groups of which it is a member:

```
Device# show crypto gdoi
```

GROUP INFORMATION

```

Group Name              : GETV6
Group Identity          : 1111
Crypto Path             : ipv6
Key Management Path     : ipv4
Rekeys received        : 0
IPSec SA Direction     : Both

Group Server list      : 192.0.2.1
                       : 192.0.2.11

Group member           : 192.0.2.2          vrf: None
Version                : 1.0.4

```

```

Registration status      : Registered
Registered with         : 192.0.2.1
Re-registers in         : 3116 sec
Succeeded registration: 1
Attempted registration: 1
Last rekey from         : 192.0.2.254
Last rekey seq num     : 0
Unicast rekey received: 0
Rekey ACKs sent        : 0
Rekey Received         : never
allowable rekey cipher: any
allowable rekey hash   : any
allowable transformtag: any ESP

```

```

Rekeys cumulative
Total received          : 0
After latest register  : 0
Rekey Acks sents       : 0

```

ACL Downloaded From KS 192.0.2.1:

```

access-list deny tcp host 2001:DB8:1::1 eq 0 host 2001:DB8:0:ABCD::1 eq 0 sequence 1
access-list permit ipv6 host 2001:DB8:1::1 host 2001:DB8:0:ABCD::1 sequence 2
access-list permit ipv6 host 2001:DB8:0:ABCD::1 host 2001:DB8:1::1 sequence 3
access-list deny udp 2001:DB8:0001::/48 eq 0 2001:DB8:0002::/48 eq 0 sequence 4
access-list deny udp 2001:DB8:0002::/48 eq 0 2001:DB8:0001::/48 eq 0 sequence 5
access-list permit icmp 2001:DB8:0001::/48 2001:DB8:0002::/48 sequence 6
access-list permit icmp 2001:DB8:0002::/48 2001:DB8:0001::/48 sequence 7

```

KEK POLICY:

```

Rekey Transport Type    : Unicast
Lifetime (secs)         : 86013
Encrypt Algorithm       : AES
Key Size                 : 128
Sig Hash Algorithm      : HMAC_AUTH_SHA
Sig Key Length (bits)   : 1024

```

TEK POLICY for the current KS-Policy ACEs Downloaded:

Ethernet2/0:

IPsec SA:

```

spi: 0x627E4B84(1652444036)
transform: esp-aes
sa timing:remaining key lifetime (sec): (3214)
Anti-Replay(Time Based) : 10 sec interval
tag method : cts sgt
alg key size: 24 (bytes)
sig key size: 20 (bytes)
encaps: ENCAPS_TUNNEL

```

GROUP INFORMATION

```

Group Name              : GETV4
Group Identity          : 2222
Crypto Path             : ipv4
Key Management Path     : ipv4
Rekeys received         : 0
IPSec SA Direction     : Both

Group Server list      : 192.0.2.1

Group member           : 192.0.2.2          vrf: None
Version                : 1.0.4
Registration status    : Registered

```



```

Registered with      : 192.0.2.1
Re-registers in     : 3058 sec
Succeeded registration: 1
Attempted registration: 1
Last rekey from     : 192.0.2.254
Last rekey seq num  : 0
Unicast rekey received: 0
Rekey ACKs sent     : 0
Rekey Received      : never
allowable rekey cipher: any
allowable rekey hash : any
allowable transformtag: any ESP

Rekeys cumulative
Total received      : 0
After latest register : 0
Rekey Acks sents   : 0

ACL Downloaded From KS 192.0.2.1:
access-list permit icmp host 192.0.2.2 host 192.0.2.3
access-list permit icmp host 192.0.2.3 host 192.0.2.2

KEK POLICY:
Rekey Transport Type : Unicast
Lifetime (secs)      : 86013
Encrypt Algorithm    : 3DES
Key Size             : 192
Sig Hash Algorithm   : HMAC_AUTH_SHA
Sig Key Length (bits) : 1024

TEK POLICY for the current KS-Policy ACEs Downloaded:
Ethernet2/0:
IPsec SA:
spi: 0xF6E6B597(4142314903)
transform: esp-aes
sa timing:remaining key lifetime (sec): (3214)
Anti-Replay : Disabled
tag method : cts sgt
alg key size: 24 (bytes)
sig key size: 20 (bytes)
encaps: ENCAPS_TUNNEL

```

The following example shows how to enter the command on a GM to display GET VPN group information for all groups of which it is a member. This is an example in which Suite B is configured; it shows that when you are using GCM or GMAC, the TEK POLICY section includes a separate IPsec SA with a unique security parameter index (SPI) for each ACL entry downloaded:

```

Device# show crypto gdoi

GROUP INFORMATION

Group Name           : diffint
Group Identity       : 1234
Crypto Path          : ipv4
Key Management Path  : ipv4
Rekeys received      : 0
IPSec SA Direction  : Both

Group Server list    : 10.0.8.1

Group member         : 10.0.3.1      vrf: None
Version              : 1.0.4

```

```

Registration status      : Registered
Registered with         : 10.0.8.1
.
.
.
ACL Downloaded From KS 10.0.8.1:
access-list  permit ip host 10.0.1.1 host 239.0.1.1
access-list  permit ip host 10.0.100.2 host 238.0.1.1
access-list  permit ip host 10.0.1.1 host 10.0.100.2
access-list  permit ip host 10.0.100.2 host 10.0.1.1

KEK POLICY:
Rekey Transport Type    : Unicast
Lifetime (secs)         : 85740
Encrypt Algorithm       : 3DES
Key Size                : 192
Sig Hash Algorithm      : HMAC_AUTH_SHA256
Sig Key Length (bits)   : 1024

TEK POLICY for the current KS-Policy ACEs Downloaded:
Ethernet3/0:
IPsec SA:
  spi: 0x318846DE(831014622)
  transform: esp-gcm
  sa timing:remaining key lifetime (sec): (86350)
  Anti-Replay(Counter Based) : 64
  tag method : disabled
  alg key size: 24 (bytes)
  sig key size: 20 (bytes)
  encaps: ENCAPS_TUNNEL

IPsec SA:
  spi: 0xF367AEA0(4083658400)
  transform: esp-gcm
  sa timing:remaining key lifetime (sec): (86350)
  Anti-Replay(Counter Based) : 64
  tag method : disabled
  alg key size: 24 (bytes)
  sig key size: 20 (bytes)
  encaps: ENCAPS_TUNNEL

IPsec SA:
  spi: 0xE583A3F5(3850609653)
  transform: esp-gcm
  sa timing:remaining key lifetime (sec): (86350)
  Anti-Replay(Counter Based) : 64
  tag method : disabled
  alg key size: 24 (bytes)
  sig key size: 20 (bytes)
  encaps: ENCAPS_TUNNEL

IPsec SA:
  spi: 0xE9AC04C(245022796)
  transform: esp-gcm
  sa timing:remaining key lifetime (sec): (86350)
  Anti-Replay(Counter Based) : 64
  tag method : disabled
  alg key size: 24 (bytes)
  sig key size: 20 (bytes)
  encaps: ENCAPS_TUNNEL

```

The following example shows how to enter the command on a KS to display GET VPN group information for a specific group:

```
Device# show crypto gdoi group diffint

GROUP INFORMATION

Group Name           : diffint (Multicast)
Group Identity       : 3333
Group Members        : 1
IPSec SA Direction   : Both
Group Rekey Lifetime : 300 secs
Group Rekey
  Remaining Lifetime : 260 secs
Rekey Retransmit Period : 10 secs
Rekey Retransmit Attempts: 2
Group Retransmit
  Remaining Lifetime : 0 secs

IPSec SA Number      : 1
IPSec SA Rekey Lifetime: 300 secs
Profile Name         : gdoi-p
Replay method        : Count Based
Replay Window Size   : 64
SA Rekey
  Remaining Lifetime : 261 secs
ACL Configured       : access-list 120

IPSec SA Number      : 2
IPSec SA Rekey Lifetime: 300 secs
Profile Name         : gdoi-p
Replay method        : Count Based
Replay Window Size   : 64
SA Rekey
  Remaining Lifetime : 261 secs
ACL Configured       : access-list 122

Group Server list    : Local
```

The following example shows how to enter the command on a KS to display basic KS status and parameters:

```
Device# show crypto gdoi ks

Total group members registered to this box: 2

Key Server Information For Group diffint:
Group Name           : diffint
Group Identity       : 3333
Group Members        : 2
IPSec SA Direction   : Both
Data Path            : IPv6
Control Path         : IPv4
ACL Configured       : access-list 120
```

The following example shows how to enter the command on a KS to display KS policy information. This is an example in which Suite B is configured; it shows the Selector field, which matches the IPsec SA SPI with the ACL that it downloaded:

```

Device# show crypto gdoi ks policy

Key Server Policy:
For group diffint (handle: 2147483650) server 10.0.8.1 (handle: 2147483650):

# of teks : 5  Seq num : 0
.
.
.
TEK POLICY (encaps : ENCAPS_TUNNEL)
  spi           : 0xE7994585
  access-list   : gcm-acl
  Selector      : permit ip host 10.0.1.1 host 239.0.1.1
  transform     : esp-gcm
  alg key size  : 16           sig key size      : 0
  orig life(sec): 900         remaining life(sec) : 676
  tek life(sec) : 900         elapsed time(sec)  : 224
  override life (sec): 0       antireplay window size: 64

TEK POLICY (encaps : ENCAPS_TUNNEL)
  spi           : 0x87CB1FA3
  access-list   : gcm-acl
  Selector      : permit ip host 10.0.100.2 host 238.0.1.1
  transform     : esp-gcm
  alg key size  : 16           sig key size      : 0
  orig life(sec): 900         remaining life(sec) : 676
  tek life(sec) : 900         elapsed time(sec)  : 224
  override life (sec): 0       antireplay window size: 64

```

The following example shows how to enter the command on a KS to display the encryption ACLs for groups. This example displays a numbered encryption ACL, which means that it is an IPv4 ACL (because IPv6 allows only named ACLs):

```

Device# show crypto gdoi ks acl

Group Name           : diffint
Configured ACL       : access-list 101 permit gre any any

```

The following example shows how to enter the command on a KS to display the encryption ACLs for groups. This example displays named encryption ACLs for two groups (an IPv4 group and an IPv6 group):

```

Device# show crypto gdoi ks acl

Group Name: GETV6
Configured ACL:
  access-list ACL_GETV6_MIX deny tcp host 2001:DB8:1::1 host 2001:DB8:0:ABCD::1 sequence
  10
  access-list ACL_GETV6_MIX permit ipv6 host 2001:DB8:1::1 host 2001:DB8:0:ABCD::1 sequence
  20
  access-list ACL_GETV6_MIX permit ipv6 host 2001:DB8:0:ABCD::1 host 2001:DB8:1::1 sequence
  30
  access-list ACL_GETV6_MIX deny udp 2001:DB8:0001::/48 2001:DB8:0002::/48 sequence 40
  access-list ACL_GETV6_MIX deny udp 2001:DB8:0002::/48 2001:DB8:0001::/48 sequence 50
  access-list ACL_GETV6_MIX permit icmp 2001:DB8:0001::/48 2001:DB8:0002::/48 sequence
  60
  access-list ACL_GETV6_MIX permit icmp 2001:DB8:0002::/48 2001:DB8:0001::/48 sequence
  70

```

```

Group Name: GETV4
Configured ACL:
  access-list ACL_GETV4_HOST permit icmp host 192.0.2.2 host 192.0.2.3
  access-list ACL_GETV4_HOST permit icmp host 192.0.2.3 host 192.0.2.2

```

The following example shows how to enter the command on a GM to display the encryption ACLs for the groups to which it belongs. Even though a GM can be in any combination of IPv4 and IPv6 groups, this example shows that the GM is a member of only one group (in this case, an IPv6 group):

```

Device# show crypto gdoi gm acl

Group Name: GETV6
ACL Downloaded From KS 192.0.2.1:
  access-list permit ipv6 2001:DB8:0001::/48 2001:DB8:0002::/48 sequence 1
  access-list permit ipv6 2001:DB8:0002::/48 2001:DB8:0001::/48 sequence 2

```

The following example shows how to enter the command on a GM to display the encryption ACLs for the groups to which it belongs. In this case, the GM belongs to two groups (an IPv4 group and an IPv6 group):

```

Device# show crypto gdoi gm acl

Group Name: GETV6
ACL Downloaded From KS 192.0.2.1:
  access-list deny tcp host 2001:DB8:1::1 eq 0 host 2001:DB8:0:ABCD::1 eq 0 sequence 1
  access-list permit ipv6 host 2001:DB8:1::1 host 2001:DB8:0:ABCD::1 sequence 2
  access-list permit ipv6 host 2001:DB8:0:ABCD::1 host 2001:DB8:1::1 sequence 3
  access-list deny udp 2001:DB8:0001::/48 eq 0 2001:DB8:0002::/48 eq 0 sequence 4
  access-list deny udp 2001:DB8:0002::/48 eq 0 2001:DB8:0001::/48 eq 0 sequence 5
  access-list permit icmp 2001:DB8:0001::/48 2001:DB8:0002::/48 sequence 6
  access-list permit icmp 2001:DB8:0002::/48 2001:DB8:0001::/48 sequence 7
ACL Configured Locally:

Group Name: GETV4
ACL Downloaded From KS 192.0.2.1:
  access-list permit icmp host 192.0.2.2 host 192.0.2.3
  access-list permit icmp host 192.0.2.3 host 192.0.2.2
ACL Configured Locally:

```

The following example shows how to enter the command on a KS to display KS sender ID (KSSID) information (for Suite B):

```

Device# show crypto gdoi ks identifier

KS Sender ID (KSSID) Information for Group GETVPN:

Transform Mode           : Counter (Suite-B)
Re-initializing          : Yes
SID Length (Group Size) : 24 bits (MEDIUM)
Current KSSID In-Use    : 25
Last GMSID Used         : 108

KS Sender ID (KSSID) Information for Group GETVPN-NO-GCM:

Transform Mode           : Non-Counter (Non-Suite-B)

```

If this KS is a secondary cooperative KS, the configured group size (which you can view by using the **show running-config** command) might differ from the size in the SID Length (Group Size) field above if the primary cooperative KS has not yet switched to using the new group size. (If the group size is being changed, all secondary cooperative KSs must first configure the new group size, and then the primary cooperative KS must configure the new group size before it is used by all cooperative KSs.)

The following example shows how to enter the command on a KS to display detailed KSSID information (for Suite B):

```
Device# show crypto gdoi ks identifier detail

KS Sender ID (KSSID) Information for Group GETVPN:

  Transform Mode           : Counter (Suite-B)
  Re-initializing          : Yes
  SID Length (Group Size)  : 24 bits (MEDIUM)
  Current KSSID In-Use     : 25
  Last GMSID Used         : 108

  KSSID(s) Assigned       : 0, 10, 22-36, 95-103
  KSSID(s) Used           : 26-32
  KSSID(s) Used (Old)     : 0, 10, 22-25
  Available KSSID(s)     : 33-36, 95-103

KS Sender ID (KSSID) Information for Group GETVPN-NO-GCM:

  Transform Mode           : Non-Counter (Non-Suite-B)
```

If no KSSIDs are in a set, the corresponding fields display a value of none:

```
KSSID(s) Assigned       : none
KSSID(s) Used           : none
KSSID(s) Used (Old)    : none
Available KSSID(s)     : none
```

The following example shows how to enter the command on a primary cooperative KS to display KSSID information for cooperative KSs (for Suite B):

```
Device# show crypto gdoi ks coop identifier

COOP-KS Sender ID (SID) Information for Group GETVPN:

  Local KS Role: Primary , Local KS Status: Alive
  Local Address           : 10.0.5.2
  Next SID Client Operation : NOTIFY
  Re-initializing         : No
  KSSID Overlap           : No
  SID Length (Group Size) Cfg : 24 bits (MEDIUM)
  SID Length (Group Size) Used : 24 bits (MEDIUM)
  Current KSSID In-Use     : 4
  KSSID(s) Assigned       : 0-4, 10
  KSSID(s) Used           : 2-4
  Old KSSID(s) Used       : none
```

The following example shows how to enter the command on a primary cooperative KS to display detailed KSSID information for cooperative KSs (for Suite B):

```

Device# show crypto gdoi ks coop identifier detail

COOP-KS Sender ID (SID) Information for Group GETVPN:

  Local KS Role: Primary , Local KS Status: Alive
    Local Address           : 10.0.5.2
    Next SID Client Operation : NOTIFY
    Re-initializing         : No
    KSSID Overlap           : No
    SID Length (Group Size) Cfg : 24 bits (MEDIUM)
    SID Length (Group Size) Used : 24 bits (MEDIUM)
    Current KSSID In-Use     : 4
    KSSID(s) Assigned        : 0-4, 10
    KSSID(s) Used            : 2-4
    Old KSSID(s) Used        : none

  Peer KS Role: Secondary , Peer KS Status: Alive
    Peer Address            : 10.0.6.2
    Next SID Client Operation : NOTIFY
    Re-initializing         : No
    KSSID Overlap           : No
    SID Length (Group Size) Cfg : 32 bits (LARGE)
    SID Length (Group Size) Used : 24 bits (MEDIUM)
    Current KSSID In-Use     : 6
    KSSID(s) Assigned        : 5-9
    KSSID(s) Used            : 5-6
    Old KSSID(s) Used        : none

  Peer KS Role: Secondary , Peer KS Status: Dead
    Peer Address            : 10.0.7.2
    Next SID Client Operation : NOTIFY
    Re-initializing         : No
    KSSID Overlap           : No
    SID Length (Group Size) Cfg : 24 bits (MEDIUM)
    SID Length (Group Size) Used : 24 bits (MEDIUM)
    Current KSSID In-Use     : 109
    KSSID(s) Assigned        : 100-110
    KSSID(s) Used            : 100-109
    Old KSSID(s) Used        : none

```

Only the primary cooperative KS has information for all peer cooperative KSs. The secondary KS has the SID information only for itself and for the primary KS.

Note that with the SID Length (Group Size) fields, when changing the group size for S1 to S2 (for any group size), all secondaries must be configured with S2 first, and then the primary can configure S2. Only after the primary configures S2 will the primary and secondaries begin to use S2. Therefore, when a secondary has configured the new group size S2, the local **show** command still shows the old group size S1 being used, because S2 is not yet in use (until the primary changes to S2). However, the **show** command when used on the cooperative KS will show that S2 is configured.

The following example shows how to enter the command on a secondary cooperative KS to display KSSID information for cooperative KSs (for Suite B):

```

Device# show crypto gdoi ks coop identifier

COOP-KS Sender ID (SID) Information for Group GETVPN:

  Local KS Role: Secondary , Local KS Status: Alive
    Local Address           : 10.0.6.2
    Next SID Client Operation : NOTIFY

```

```

Re-initializing           : No
KSSID Overlap            : No
SID Length (Group Size) Cfg : 32 bits (LARGE)
SID Length (Group Size) Used : 24 bits (MEDIUM)
Current KSSID In-Use     : 6
KSSIDs Assigned          : 5-9
KSSIDs Used              : 5-6
Old KSSIDs Used          : none

```

The following example shows how to enter the command on a secondary cooperative KS to display detailed KSSID information for cooperative KSs (for Suite B):

```

Device# show crypto gdoi ks coop identifier detail

COOP-KS Sender ID (SID) Information for Group GETVPN:

  Local KS Role: Secondary , Local KS Status: Alive
  Local Address           : 10.0.6.2
  Next SID Client Operation : NOTIFY
  Re-initializing         : No
  KSSID Overlap           : No
  SID Length (Group Size) Cfg : 32 bits (LARGE)
  SID Length (Group Size) Used : 24 bits (MEDIUM)
  Current KSSID In-Use     : 6
  KSSIDs Assigned         : 5-9
  KSSIDs Used             : 5-6
  Old KSSIDs Used         : none

  Peer KS Role: Primary , Peer KS Status: Alive
  Peer Address            : 10.0.5.2
  Next SID Client Operation : NOTIFY
  Re-initializing         : No
  KSSID Overlap           : No
  SID Length (Group Size) Cfg : 24 bits (MEDIUM)
  SID Length (Group Size) Used : 24 bits (MEDIUM)
  Current KSSID In-Use     : 4
  KSSIDs Assigned         : 0-4, 10
  KSSIDs Used             : 2-4
  Old KSSIDs Used         : none

```

The following example shows how to enter the command on a KS to display cooperative KS and client GET VPN software versions:

```

Device# show crypto gdoi ks coop version

Cooperative key server infra Version : 1.0.2

Client : KS_POLICY_CLIENT           Version : 1.0.1
Client : GROUP_MEMBER_CLIENT        Version : 1.0.1
Client : SID_CLIENT                  Version : 1.0.1

```

The following example shows how to enter the command on a GM to display the SID information for each registered GM in the group to which the GM belongs (for Suite B):

```

Device# show crypto gdoi gm identifier

GM Sender ID (SID) Information for Group diffint:

Group Member: 10.0.1.2           vrf: None

```



```

Transform Mode           : Counter (Suite-B)
# of SIDs Last Requested : 2

CURRENT SIDs:
  SID Length (Group Size) : 24 bits (MEDIUM)
  # of SIDs Downloaded    : 2
  First SID Downloaded    : 0x00000D
  Last SID Downloaded     : 0x00000E

Group Member: 10.0.3.1   vrf: None
Transform Mode           : Counter (Suite-B)
# of SIDs Last Requested : 2

CURRENT SIDs:
  SID Length (Group Size) : 24 bits (MEDIUM)
  # of SIDs Downloaded    : 2
  First SID Downloaded    : 0x00000F
  Last SID Downloaded     : 0x000010

```

The following example shows how to enter the command on a GM to display detailed SID information for each registered GM in the group to which the GM belongs (for Suite B):

```
Device# show crypto gdoi gm identifier detail
```

```
GM Sender ID (SID) Information for Group diffint:
```

```

Group Member: 10.0.1.2   vrf: None
Transform Mode           : Counter (Suite-B)
# of SIDs Last Requested : 2

CURRENT SIDs:
  SID Length (Group Size) : 24 bits (MEDIUM)
  # of SIDs Downloaded    : 2
  First SID Downloaded    : 0x00000D
  Last SID Downloaded     : 0x00000E

  CM Interface   Bandwidth (Kbps)  MTU (Bytes)  # SIDs
  =====
  Gi0/1          10000             1500         1
  Gi0/2          10000             1000         1

OLD SIDs:
  SID Length (Group Size) : 24 bits (MEDIUM)
  # of SIDs Downloaded    : 2
  First SID Downloaded    : 0x00000B
  Last SID Downloaded     : 0x00000C

NEXT SID REQUEST:
  TEK Lifetime           : 7200 sec
  SID Length (Group Size) : 24 bits (MEDIUM)

Group Member: 10.0.3.1   vrf: None
Transform Mode           : Counter (Suite-B)
# of SIDs Last Requested : 2

CURRENT SIDs:
  SID Length (Group Size) : 24 bits (MEDIUM)
  # of SIDs Downloaded    : 2
  First SID Downloaded    : 0x00000F
  Last SID Downloaded     : 0x000010

```

```

CM Interface      Bandwidth (Kbps)  MTU (Bytes)  # SIDs
=====
Gi1/0             10000             1500         1
Gi1/1             10000             1000         1

OLD SIDs: none

NEXT SID REQUEST:
  TEK Lifetime           : 7200 sec
  SID Length (Group Size) : 24 bits (MEDIUM)

```

The following example shows how to enter the command on a KS to display KS status and parameters for a specific GDOI group:

```

Device# show crypto gdoi group diffint ks

Group Information
  Group Name           : diffint
  Group Identity       : 3333
  Group Members Registered : 1
  Group Server         : Local
  Group Rekey Lifetime : 300 secs
  Group Rekey
    Remaining Lifetime : 84 secs
  IPsec SA Number     : 1
  IPsec SA Rekey Lifetime : 120 secs
  Profile Name         : gdoi-p
  SA Rekey
    Remaining Lifetime : 64 secs
  access-list 120 permit ip host 10.0.1.1 host 192.168.1.1
  access-list 120 permit ip host 10.0.100.2 host 192.168.1.1
  Group Member List for Group diffint :
  Member ID           : 10.0.3.1
  Group Name           : test
  Group Identity       : 4444
  Group Members Registered : 0
  Group Server         : Local
  Group Rekey Lifetime : 600 secs
  IPsec SA Number     : 1
  IPsec SA Rekey Lifetime : 120 secs
  Profile Name         : gdoi-p
  access-list 120 permit ip host 10.0.1.1 host 192.168.1.1
  access-list 120 permit ip host 10.0.100.2 host 192.168.1.1

```

The following example shows how to enter the command on a GM to display brief status information for a specific GDOI group:

```

Device# show crypto gdoi group diffint gm

Group Member Information For Group diffint:
  IPsec SA Direction   : Both
  ACL Received From KS : gdoi_group_diffint_temp_acl

  Group member         : 10.0.3.1          vrf: None
  Version               : 1.0.2
  Registration status   : Registered
  Registered with       : 10.0.5.2
  Re-registers in      : 77 sec
  Succeeded registration: 1
  Attempted registration: 1
  Last rekey from      : 10.0.5.2

```

```

Last rekey seq num   : 0
Multicast rekey rcvd : 9

```

The following example shows how to enter the command on a KS to display KS information for registered GMs:

```

Device# show crypto gdoi ks members

Group Member Information :
Detail :
Number of rekeys sent for group diffint : 10
Group Member ID   : 10.0.0.1
Group ID          : 3333
Group Name        : diffint
Key Server ID     : 192.0.2.253
Rekeys sent       : 10
Rekeys retries    : 0
Rekey Acks Rcvd  : 10
Rekey Acks missed : 0
Sent seq num :    2    3    1    2
Rcvd seq num :    2    3    1    2
Group Member ID   : 192.0.2.251
Group ID          : 3333
Group Name        : diffint
Key Server ID     : 192.0.2.252
Rekeys sent       : 10
Rekeys retries    : 0
Rekey Acks Rcvd  : 10
Rekey Acks missed : 0
Sent seq num :    2    3    1    2
Rcvd seq num :    2    0    0    0

```

The following example shows how to enter the command on a GM to verify the RSA public key that is downloaded from the KS:

```

Device# show crypto gdoi gm pubkey

GDOI Group: diffint
KS IP Address: 10.0.9.1
conn-id: 1020   my-cookie:BFC164DB   his-cookie:3F2C75D9
Key Data:
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00B508E9 EDD36AE1
B7AFEB96 74AAD793 4AAA549B 91809707 25AE59E7 E7359CB3 6C938C82 5ED17AC3
9E1B1611 DF3791DD FBAC8C4B EEEDC4F5 46C4472A BAAE0870 69020301 0001

```

For RSA public keys, the KS sends the GM the RSA public key when the GM registers. When the KS sends a rekey, it signs it using the RSA private key. After the GM receives this rekey, it verifies the signature using the public key that it downloaded from the KS (therefore, the GM knows that it received the rekey from the KS).

The following example shows how to use the command on a GM to display information about the IPsec SA for each group to which the GM belongs (this command cannot be used on a KS):

```

Device# show crypto gdoi ipsec sa

SA created for group GETV6:
Ethernet2/0:
protocol = ip

```

```

local ident = 2001:DB8:0001::/48, port = 0
remote ident = 2001:DB8:0002::/48, port = 0
direction: Both, replay(method/window): Time/6 sec
protocol = ip
local ident = 2001:DB8:0002::/48, port = 0
remote ident = 2001:DB8:0001::/48, port = 0
direction: Both, replay(method/window): Time/6 sec

```

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in the GET VPN network support the GM removal feature:

```
Device# show crypto gdoi feature gm-removal
```

```

Group Name: GET
Key Server ID      Version  Feature Supported
10.0.8.1           1.0.2   Yes
10.0.9.1           1.0.2   Yes
10.0.10.1          1.0.2   Yes
10.0.11.1          1.0.2   Yes
Group Member ID   Version  Feature Supported
10.0.0.2           1.0.2   Yes
10.0.0.3           1.0.1   No

```

The following example shows how enter the command on the KS (or primary KS) to find only those devices that do *not* support GM removal:

```
Device# show crypto gdoi feature gm-removal | include No
```

```

10.0.0.3           1.0.1   No

```

The above example shows that the GM with IP address 10.0.0.3 is running older software version 1.0.1 (which does not support GM removal) and should be upgraded. You can also enter the above command on a GM.

The following example shows how to use the GET VPN software versioning command on a GM to check whether it supports the GM removal feature:

```
Device# show crypto gdoi feature gm-removal
```

```

Version  Feature Supported
1.0.2    Yes

```

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether devices in the GET VPN network support rekey triggering after KS policy replacement:

```
Device# show crypto gdoi feature policy-replace
```

```

Group Name: GET
Key Server ID      Version  Feature Supported
10.0.8.1           1.0.2   Yes
10.0.9.1           1.0.2   Yes
10.0.10.1          1.0.2   Yes
10.0.11.1          1.0.2   Yes
Group Member ID   Version  Feature Supported

```

```

192.0.2.2      1.0.2      Yes
10.0.0.3      1.0.1      No

```

You can also enter the above command on a GM.

The following example shows how to enter the command on the KS (or primary KS) to find only those devices that do *not* support rekey triggering after policy replacement:

```

Device# show crypto gdoi feature policy-replace | include No

10.0.0.3      1.0.1      No

```

For these devices, the primary KS sends only the triggered rekey without instructions for policy replacement. Therefore, when a GM receives the rekey, it installs the new SAs but does not shorten the lifetimes of the old SAs. This behavior is the same as the old rekey method and ensures backward compatibility. You can also enter the above command on a GM.

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in the GET VPN network support the GDOI MIB:

```

Device# show crypto gdoi feature gdoi-mib

Group Name: GET
Key Server ID      Version  Feature Supported
10.0.8.1           1.0.2   Yes
10.0.9.1           1.0.2   Yes
10.0.10.1          1.0.2   Yes
10.0.11.1          1.0.2   Yes
Group Member ID   Version  Feature Supported
192.0.2.2         1.0.2   Yes
10.0.0.3          1.0.1   No

```

You can also enter the above command on a GM.

The following example shows how to enter the command on the KS (or primary KS) to find only those devices that do *not* support the GDOI MIB:

```

Device# show crypto gdoi feature gdoi-mib | include No

10.0.0.3      1.0.1      No

```

You can also enter the above command on a GM.

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in each group support GET VPN for IPv6 in the Data Plane (and thus can be added to an IPv6 group):

```

Device# show crypto gdoi feature ipv6-crypto-path

Group Name: GET
Key Server ID      Version  Feature Supported
10.0.8.1           1.0.3   Yes
10.0.9.1           1.0.3   Yes
10.0.10.1          1.0.3   Yes
10.0.11.1          1.0.3   Yes
Group Member ID   Version  Feature Supported
192.0.2.2         1.0.3   Yes

```

```
10.0.0.3      1.0.1      No
```

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to enter the command on the KS (or primary KS) to find only those devices in the GET VPN network that do *not* support GET VPN for IPv6 in the Data Plane:

```
Device# show crypto gdoi feature ipv6-crypto-path | include No
10.0.0.3      1.0.1      No
```

All devices in the same GDOI group (including the KS, cooperative KSs, and GMs) must support the GET VPN for IPv6 in the Data Plane feature before the group's KS can enable the feature. To enable the feature for a group, you must ensure that all devices in the group are running compatible versions of the GET VPN software.

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in each group support Suite B cryptography:

```
Device# show crypto gdoi feature suite-b

Group Name: GETVPN
  Key Server ID      Version  Feature Supported
  10.0.5.2            1.0.4   Yes
  10.0.6.2            1.0.4   Yes
  10.0.7.2            1.0.3   No
  10.0.8.2            1.0.2   No

  Group Member ID    Version  Feature Supported
  10.0.1.2            1.0.2   No
  10.0.2.5            1.0.3   No
  10.0.3.1            1.0.4   Yes
  10.0.3.2            1.0.4   Yes
```

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to enter the command on the KS (or primary KS) to find only those devices in the GET VPN network that do *not* support Suite B:

```
Device# show crypto gdoi feature suite-b | include No
10.0.7.2      1.0.3      No
10.0.8.2      1.0.2      No
10.0.1.2      1.0.2      No
10.0.2.5      1.0.3      No
```

All devices in the same GDOI group (including the KS, cooperative KSs, and GMs) must support the Suite B feature before the group's KS can enable the feature. To enable the feature for a group, you must ensure that all devices in the group are running compatible versions of the GET VPN software.

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in each group support IPsec inline tagging for Cisco TrustSec:

```
Device# show crypto gdoi feature cts-sgt

Group Name: GETVPN
  Key Server ID      Version  Feature Supported
  10.0.5.2            1.0.5   Yes
  10.0.6.2            1.0.5   Yes
  10.0.7.2            1.0.3   No
  10.0.8.2            1.0.2   No

  Group Member ID    Version  Feature Supported
  10.0.1.2            1.0.2   No
  10.0.2.5            1.0.3   No
  10.0.3.1            1.0.5   Yes
  10.0.3.2            1.0.5   Yes
```

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to enter the command on the KS (or primary KS) to find only those devices in the GET VPN network that *do not* support IPsec inline tagging for Cisco TrustSec:

```
Device# show crypto gdoi feature cts-sgt | include No

  10.0.7.2            1.0.3   No
  10.0.8.2            1.0.2   No
  10.0.1.2            1.0.2   No
  10.0.2.5            1.0.3   No
```

All devices in the same GDOI group (including the KS, cooperative KSs, and GMs) must support the IPsec inline tagging for Cisco TrustSec feature before the group's KS can enable the feature. To enable the feature for a group, you must ensure that all devices in the group are running compatible versions of the GET VPN software.

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to use the GET VPN software versioning command on the KS (or primary KS) to check whether all the devices in each group support long SA lifetimes (from 24 hours to 30 days):

```
Device# show crypto gdoi feature long-sa-lifetime

Group Name: GETVPN
  Key Server ID      Version  Feature Supported
  10.0.5.2            1.0.5   Yes
  10.0.6.2            1.0.5   Yes
  10.0.7.2            1.0.3   No
  10.0.8.2            1.0.2   No

  Group Member ID    Version  Feature Supported
  10.0.1.2            1.0.2   No
```

| | | |
|----------|-------|-----|
| 10.0.2.5 | 1.0.3 | No |
| 10.0.3.1 | 1.0.5 | Yes |
| 10.0.3.2 | 1.0.5 | Yes |

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following example shows how to enter the command on the KS (or primary KS) to find only those devices in the GET VPN network that do *not* support long SA lifetimes:

```
Device# show crypto gdoi feature long-sa-lifetime | include No

10.0.7.2      1.0.3      No
10.0.8.2      1.0.2      No
10.0.1.2      1.0.2      No
10.0.2.5      1.0.3      No
```

All devices in the same GDOI group (including the KS, cooperative KSs, and GMs) must support long SA lifetimes before the group's KS can enable the feature. To enable the feature for a group, you must ensure that all devices in the group are running compatible versions of the GET VPN software.

You can also enter the above command on a GM (which will display the information for the GM but not for the KS or other GMs).

The following sample output shows detailed information about the SAs:

```
Router# show crypto gdoi rekey sa detail
KEK SA DB STATS:
  num_active = 2
  num_malloc = 46014
  num_free = 46011

KEK POLICY (transport type : Unicast)
Local addr/port : 1.2.20.32/848
Remote addr/port : 10.1.2.1/848
spi : 0x72C3C67E7B15BF701C30A0C22E1A1A7E
management alg : disabled   encrypt alg : 3DES
crypto iv length : 8         key size : 24
orig life(sec) : 0
sig hash algorithm : enabled   sig key length : 94
sig size : 64                conn_id : 33957
seq num : 0                  prev seq num : 0
handle : 80009EFE           Interface : GigabitEthernet
group name : gdoi-group1

KEK POLICY (transport type : Unicast)
Local addr/port : 1.2.20.32/848
Remote addr/port : 10.1.2.1/848
spi : 0xFCDDDD8333235B1652FA922BE85FAD65
management alg : disabled   encrypt alg : 3DES
crypto iv length : 8         key size : 24
orig life(sec) : 0
sig hash algorithm : enabled   sig key length : 94
sig size : 64                conn_id : 33956
seq num : 0                  prev seq num : 0
handle : 80009E4D           Interface : GigabitEthernet
group name : gdoi-group1
```


The table below describes the significant fields shown in the displays.

Table 9: show crypto gdoi Field Descriptions

| Field | Description |
|-------------------------------------|---|
| Group Name | Name of the GDOI group. |
| Group Identity | GDOI group identity number or address. |
| Crypto Path | IP version for the data plane. IPv6 shows that group policies are defined in IPv6. |
| Key Management Path | IP version for the control plane. IPv4 shows that the control path for this group is in IPv4. |
| Group Members | Number of GMs that are registered to the KS. |
| IPSec SA Direction | Direction of the IPSec SA. Direction can be inbound (Receive Only) or bidirectional (Both). |
| Redundancy | Indicates whether KS redundancy is configured (meaning whether there are cooperative KSs). |
| Local Address | IP address of the local KS. |
| Local Priority | Priority of the local KS among the group of cooperative KSs. |
| Local KS Status | Indicates whether the local KS is active (alive). |
| Local KS Role | Indicates whether the local KS is the primary KS or a cooperative KS. |
| Local KS Version | Version of the GET VPN software running on the local KS. |
| Group Rekey Lifetime | Time between rekeys that is configured for the group. |
| Group Rekey Remaining Lifetime | Remaining time before the next rekey for the group. |
| Rekey Retransmit Period | Period between retransmissions of the rekey (in seconds). |
| Rekey Retransmit Attempts | Number of rekey retransmission attempts. |
| Group Retransmit Remaining Lifetime | Number of seconds until the next rekey retransmission. |
| IPSec SA Number | Number of the IPSec SA. |
| IPSec SA Rekey Lifetime | Lifetime that is configured for group IPSec SAs (rekey SAs). |
| Profile Name | IPsec profile that is defined for the group. |
| Replay method | Type of anti-replay that is configured (Count Based or Time Based). |
| Replay Window Size | Window size for the replay counter. |
| SA Rekey Remaining Lifetime | Remaining lifetime of the current group IPSec SA (rekey SA). |

| Field | Description |
|------------------------|---|
| ACL Configured | Name of the ACL that is configured for the group. |
| Group Server list | Location of the list of group servers (Local if the command is issued on a KS or a list of IP addresses if issued on a GM). |
| Rekeys received | Number of rekeys received by the group. |
| Group member | IP address of the local GM. |
| vrf | Indicates whether virtual routing and forwarding (VRF) is configured on the GM. |
| Version | Version of the GET VPN software running on the GM. |
| Registration status | Indicates whether the GM is registered with a KS. |
| Registered with | IP address of the KS to which the GM is registered. |
| Re-registers in | Number of seconds until the GM reregisters with a KS. |
| Succeeded registration | Indicates whether the GM successfully registered with the KS. |
| Attempted registration | Number of times the GM attempted to register with the KS. |
| Last rekey from | IP address of the KS from which the GM received its last rekey. |
| Last rekey seq num | Anti-replay sequence number of the last rekey the GM received from the KS. |
| Unicast rekey received | Number of unicast rekeys received by the GM. |
| Rekey ACKs sent | Number of rekey acknowledgments sent by the GM to the KS. |
| Rekey Received | Indicates whether the GM has received a rekey from the KS. |
| allowable rekey cipher | Type of cipher that is acceptable for a rekey. |
| allowable rekey hash | Type of hash algorithm that is acceptable for a rekey. |
| allowable transformtag | Type of transform set that is acceptable for a rekey. |
| Rekeys cumulative | List of statistics for cumulative rekeys for the GM. |
| Total received | Total number of rekeys received by the GM. |
| After latest register | Total number of rekeys received by the GM since the most recent registration. |
| Rekey Acks sends | Total number of rekey acknowledgments sent by the GM. |
| ACL Downloaded From KS | List of ACLs that the GM has downloaded from the KS. |
| access-list | ACL configuration (policy) or configurations (policies) for the GMs. |

| Field | Description |
|--|--|
| KEK POLICY | List of details for the KEK policy. |
| Rekey Transport Type | Type of transport for rekey messages (Unicast or Multicast). |
| Lifetime (secs) | Lifetime of the rekey (in seconds). |
| Encrypt Algorithm | Encryption algorithm of the KEK policy. |
| Key Size | Encryption key size (in bits). |
| Sig Hash Algorithm | Type of algorithm for the signature key (hash). |
| Sig Key Length (bits) | Key length (in bits) for the signature key (hash). |
| TEK POLICY for the current KS-Policy ACEs Downloaded | List of details for the TEK policy for the current KS policy ACEs that were downloaded. |
| IPsec SA | List of details for the IPsec SA. |
| spi | Security parameter index (SPI) ID that is associated with the TEK. |
| transform | Transform set for the IPsec SA for the GM. |
| sa timing:remaining key lifetime (sec) | Remaining lifetime of the TEK (in seconds). |
| Anti-Replay(Time Based) | Interval duration for time-based anti-replay. |
| tag method | Method used for GET VPN inline tagging. The possible values are cts sgt (for Cisco TrustSec security group tags) or disabled. |
| alg key size | Length of the key (in bytes) for the encryption algorithm that is configured in the TEK policy. The possible key lengths are as follows: <ul style="list-style-type: none"> • 16 (AES) • 24 (AES-192) • 32 (AES-256) • 8 (DES) • 24 (3DES) • 16 (GCM) • 24 (GCM-192) • 32 (GCM-256) • 16 (GMAC) • 24 (GMAC-192) • 32 (GMAC-256) |

| Field | Description |
|---------------------------------|---|
| sig key size | Length of the key (in bytes) for the signature that is configured in the TEK policy. The possible key lengths are as follows: <ul style="list-style-type: none"> • 16 (MD5) • 20 (SHA) • 32 (SHA-256) • 48 (SHA-384) • 64 (SHA-512) |
| encaps | Type of IPsec encapsulation that is configured in the TEK policy. The possible values are ENCAPS_TUNNEL or ENCAPS_TRANSPORT. |
| Configured ACL | ACL that is configured on the KS for the group. |
| ACL Configured Locally | Details for any ACLs that are configured locally for the GM. |
| Group Member Information | List of details about the group to which the GM belongs. |
| Detail | List of details about the GMs registered to the KS. |
| Number of rekeys sent for group | Number of rekeys sent for the group. |
| Group Member ID | IP address of the GM. |
| KS IP Address | Address of the KS from which the GM received the RSA public key during registration. |
| Group ID | ID of the group to which the GM belongs. |
| Group Name | Name of the group to which the GM belongs. |
| Key Server ID | IP address of the KS for the group. |
| Rekeys sent | Number of unique rekeys sent to the group. |
| Rekeys retries | Number of rekeys resent after not being acknowledged by the group. |
| Rekey Acks Rcvd | Total number of rekeys acknowledged by the group. |
| Rekey Acks missed | Number of rekeys sent to the group but not acknowledged. |
| Sent seq num | Sequence number sent to protect against replay attacks. |
| Rcvd seq num | Sequence number received. |
| conn-id | Connection ID. |
| my-cookie | Identifier on the local device (the KS or a GM) that, when paired with the his-cookie identifier on another device (the KS or a GM), identifies a unique SA between the KS and GM. You can use this pair of identifiers to check that an RSA rekey has been properly received on a specific GM. |

| Field | Description |
|-------------------------|---|
| his-cookie | Identifier on the remote device (the KS or a GM) that, when paired with the my-cookie identifier on the local device (the KS or a GM), identifies a unique SA between the KS and GM. |
| Key Data | Contents of the key itself. |
| Version | Version of the GET VPN software that is running on the KS or GM. |
| Feature Supported | Indicates whether the specified feature (GM removal, policy replacement, GDOI MIB, and so on) is supported by the software version running on the KS or GM. |
| Data Path | IPv6 shows that group policies are defined in IPv6. |
| Control Path | IPv4 shows that the control path for this group is in IPv4. |
| Transform Mode | Indicates whether the configured transform mode for the KS or GM is counter (Suite B) or non-counter (non-Suite-B). If it is non-counter, GCM-AES or GMAC-AES is not configured (and no identifier information is displayed). |
| Re-initializing | Indicates whether the KS is reinitializing. |
| SID Length (Group Size) | SID length (group size) in bits for the KS or GM. The possible values are 8 bits (SMALL-8), 12 bits (SMALL-12), 16 bits (SMALL-16), 24 bits (MEDIUM), 32 bits (LARGE), or 4 bits (UNKNOWN). |
| Current KSSID In-Use | KSSID that is currently being used to assign SIDs to GMs during registration. If no KSSIDs are configured or assigned to a KS, the field displays a value of none. |
| Last GMSID Used | Group member SID (GMSID) that was last assigned to a registered GM as part of a SID. If no GMs have registered or no GMs have been assigned any SID yet, the field displays a value of none. |
| KSSID(s) Assigned | KSSIDs that have been configured and synchronized to the cooperative KS SID clients. |
| KSSID(s) Used | KSSIDs that have been previously used (including the current KSSID) with the current TEK or TEKs. |
| Old KSSID(s) Used | KSSIDs that were used with the previous set of TEKs after a reinitialization (and the lowered or adjusted lifetimes of the previous set of TEKs that have not yet expired). |
| Available KSSID(s) | KSSIDs that are assigned but are unused (or are old). |
| Local KS Role | Indicates whether the cooperative KS is the primary KS or a secondary KS. |
| Local KS Status | Indicates whether the local cooperative KS is alive. |
| Local Address | IP address of the local cooperative KS. |

| Field | Description |
|--|---|
| Next SID Client Operation | <p>Next SID client operation. The possible values are QUERY, NOTIFY, OR UPDATE.</p> <p>For the local KS:</p> <ul style="list-style-type: none"> • QUERY: Has not received the previous SID information for the local KS from <i>any</i> peer KS • NOTIFY: Has received the previous SID information for the local KS and is up to date • UPDATE: Needs to send an update to all peers (because something changed locally) <p>For the peer KS:</p> <ul style="list-style-type: none"> • QUERY: Has not received any SID information for the peer KS from <i>the</i> peer KS • NOTIFY: Has received the latest SID information for the peer KS and is up to date • UPDATE: The peer needs to merge (old) used KSSID sets and use the next KSSID |
| KSSID Overlap | Indicates whether two or more KSs are using the same KSSID. |
| SID Length (Group Size) Cfg | Configured SID length (group size) in bits for the cooperative KS. |
| SID Length (Group Size) Used | Actual SID length (group size) in bits for the cooperative KS. |
| Current KSSID In-Use | KSSID that is in use. |
| Old KSSID(s) Used | KSSIDs that were used with the previous set of TEKs after a reinitialization (and the lowered or adjusted lifetimes of the previous set of TEKs have not yet expired). |
| Peer Address | IP address of the peer cooperative KS. |
| COOP-KS Sender ID (SID) Information for Group <i>groupname</i> | SID details for cooperative KSs for the group. If no redundancy is configured for the group, the following message is displayed: <code>*NO* redundancy configured for this group.</code> |
| Cooperative key server infra Version | Version of the cooperative KS Protocol Infrastructure for the current GET VPN software version. |
| Client : KS_POLICY_CLIENT | Version of the cooperative KS Policy Client for the current GET VPN software version. |
| Client : GROUP_MEMBER_CLIENT | Version of the cooperative KS Group Member Database Client for the current GET VPN software version. |
| Client : SID_CLIENT | Version of the cooperative KS Sender Identifier (SID) Client for the current GET VPN software version. |

| Field | Description |
|--------------------------|---|
| # of SIDs Last Requested | Number of SIDs that were last requested. |
| CURRENT SIDs | List of details for the current SIDs used by the GM. If a GM has not yet received any SIDs or has no SIDs associated with the old TEK or TEKs, the display will show None. |
| OLD SIDs | SIDs that exist after a GM receives a rekey or reregisters and receives the new TEK or TEKs. The current SIDs become old SIDs (associated with the old TEKs). |
| # of SIDs Downloaded | Number of SIDS downloaded by the GM. The number of downloaded SIDs should always match the number of SIDs in the range of SIDs downloaded between the first downloaded SID and the last downloaded SID (inclusively). Also, the range of SIDs between the first and last SIDs should be continuous (no skipped values). |
| First SID Downloaded | First SID downloaded by the GM. |
| Last SID Downloaded | Last SID downloaded by the GM. |
| CM Interface | Statistics for the CM interfaces for the group (Bandwidth in Kbps, MTUs in bytes, and number of SIDs). |
| NEXT SID REQUEST | Statistics for the next SID request. |
| TEK Lifetime | <p>TEK lifetime. The TEK lifetime might not match the configured TEK lifetime on the KS for two reasons:</p> <ul style="list-style-type: none"> • The GM receives the <i>remaining</i> TEK lifetime in the TEK SA payload. If a GM registers in the middle of a TEK lifetime, it will not calculate SIDs based on the full TEK lifetime, but rather based only on the TEK lifetime remaining. On a rekey, the GM will store the full TEK lifetime, because the KS will send the full TEK lifetime (or as close to the full TEK lifetime as possible) and use that lifetime on the next registration (if necessary). • Using G-IKEv2 or GKM, there is no way to know the TEK lifetime before requesting SIDs. Therefore, the first registration assumes a default lifetime of 7200 seconds (to be displayed) and stores the actual TEK lifetime to use for the next registration. <p>Also, the SID length (group size) on the first registration will always be 24 bits (MEDIUM) and will update after the first registration.</p> |

Related Commands

| Command | Description |
|------------------------------------|--|
| crypto key pubkey-chain rsa | Enters public key configuration mode (so you can manually specify other devices' RSA public keys). |
| rsa-pubkey | Defines the RSA manual key to be used for encryption or signature during IKE authentication. |

| Command | Description |
|------------------------------|--------------------------------------|
| crypto isakmp policy | Defines an IKE policy. |
| lifetime (IKE policy) | Specifies the lifetime of an IKE SA. |

show crypto ha

To display all virtual IP (VIP) addresses that are currently in use by IP Security (IPSec) and Internet Key Exchange (IKE), use the **show crypto ha** command in privileged EXEC mode.

show crypto ha

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.3(11)T | This command was introduced. |

Examples

The following output from the **show crypto ha** command shows all VIP addresses that are being used by IPSec and IKE:

```
Router# show crypto ha
IKE VIP: 209.165.201.3
  stamp: 74 BA 70 27 9C 4F 7F 81 3A 70 13 C9 65 22 E7 76
IKE VIP: 255.255.255.253
  stamp: Not set
IKE VIP: 255.255.255.254
  stamp: Not set
IPSec VIP: 209.165.201.3
IPSec VIP: 255.255.255.253
IPSec VIP: 255.255.255.254
```

show crypto identity

To display the crypto identity list, use the `show crypto identity` command in privileged EXEC mode.

show crypto identity [*identity-tag*]

Syntax Description

| | |
|---------------------|--|
| <i>identity-tag</i> | (Optional) The crypto identity tag value for which to display specific crypto identity list information. |
|---------------------|--|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|------------------|--|
| 12.2(33)SRB | This command was introduced in a release earlier than Cisco IOS Release 12.2(33)SRB. |
| 12.2SX | This command was integrated into Cisco IOS Release 12.2SX. |
| 12.2(4)T | This command was integrated into Cisco IOS Release 12.2(4)T. |
| Cisco IOS XE 2.3 | This command was integrated into Cisco IOS XE Release 2.3. |

Usage Guidelines

Use the **show crypto identity** command to display the configured crypto identity of a router.

Examples

The following are sample outputs from the **show crypto identity** command:

```
Router# show crypto identity id12
crypto identity id12:
  Description: line 22
Router# show crypto identity id11
crypto identity id11:
  fqdn line22
Router# show crypto identity
crypto identity tag12:
  Description: Linedescription
  fqdn fullyauthorisedone
```

The table below describes the significant fields shown in the display.

Table 10: show crypto identity Field Descriptions

| Field | Description |
|-------------|---|
| Description | Line description. |
| fqdn | Fully qualified distinguished name identifier |

show crypto ikev2 cluster

To display the configuration of Internet Key Exchange Version 2 (IKEv2) cluster policy, use the **show crypto ikev2 cluster** command in privileged EXEC mode.

show crypto ikev2 cluster

Syntax Description This command has no keywords or arguments.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|----------|------------------------------|
| | 15.2(4)M | This command was introduced. |

Examples

The following is sample output from the **show crypto ikev2 cluster** command for an HSRP primary gateway:

```
Device# show crypto ikev2 cluster

Role: CLB Server
Status: Up/Down
CLB Clients: 5
Cluster IP: 192.168.1.100
Holdtime: 3000 ms

Load statistics:
Gateway          Role      Last seen      Prio   Load    IKE     IPsec
-----
* 192.168.1.2    Master    -              80     20%     100     200
192.168.1.4     Slave    00:00.200     100    75%     30      60
192.168.1.8     Slave    00:00.150     100    50%     34      80
192.168.1.23    Slave    00:00.300     95     60%     102     300
192.168.1.34    Dead     00:15.100     95     (100%) (3000) (4000)
```

The following is sample output from the **show crypto ikev2 cluster** command for an HSRP subordinate gateway:

```
Device# show crypto ikev2 cluster

Role: CLB Slave
Status: Up/Down
Cluster IP: 192.168.1.100
Hello-interval: 1000 ms
Update-interval: 3000 ms
Holdtime: 3000 ms

Load statistics:
Gateway          Role      Last ACK       Prio   Load    IKE     IPsec
-----
192.168.1.4     Slave    00:00.200     100    75%     30      60
```

The following table describes the significant fields shown in the display.

Table 11: show crypto ikev2 cluster Field Descriptions

| Field | Description |
|--------------------|--|
| Role | Role played by a peer in the cluster. Cluster Load Balancing (CLB) Server refers to a primary gateway and CLB Slave refers to a subordinate gateway. |
| Status | Status of the peer in the cluster. |
| Cluster IP | IP address of the cluster. This is the virtual IP address (VIP) that is sent to the FlexVPN client. |
| Hello-interval | Hello interval specified in the configuration. If not specified, it is the default hello interval. |
| Update-interval | Update interval specified in the configuration. If not specified, it is the default update interval. |
| Holdtime | Hold time specified in the configuration. If not specified, it is the default hold time. |
| Gateway | IP address of peers. |
| Role | Role played by the peer in the cluster. An asterisk (*) indicates the best candidate when this command is issued. |
| Last seen/Last ACK | Time when the gateway was last seen or acknowledged. |
| Prio | Priority of the peer. |
| Load | Load, in percent, of the peer. |
| IKE | IKE load of the peer. |
| IPsec | IPsec load of the peer. |

Related Commands

| Command | Description |
|-----------------------------|---|
| crypto ikev2 cluster | Defines an IKEv2 cluster policy in an HSRP cluster. |

show crypto ikev2 cluster detail

To display detailed configuration and state information of the Internet Key Exchange Version 2 (IKEv2) cluster, use the **show crypto ikev2 cluster detail** command in privileged EXEC mode.

show crypto ikev2 cluster detail

Syntax Description This command has no keywords or arguments.

Command Modes Privileged EXEC (#)

| Release | Modification |
|------------------------|------------------------------|
| Cisco IOSE XE 17.14.1a | This command was introduced. |

Examples

The following is a sample output from the **show crypto ikev2 cluster detail** command:

```
Device#show crypto ikev2 cluster detail
```

```
Cluster load statistics:
 Gateway          Priority    In-neg    Crypto    CPU    Mem    Composite    Prioritized
-----
 1:1:1::1         100        0.0%     0.0%     0%    24%    21.6%       21.6%
 1:1:1::2         100        0.0%     0.0%     0%    24%    21.6%       21.6%
```

```
Device#?
```

| Command | Description |
|----------------------------------|---|
| show crypto ikev2 cluster | Defines an IKEv2 cluster policy in an HSRP cluster. |

show crypto ikev2 diagnose error

To display the current Internet Key Exchange Version 2 (IKEv2) exit path database, use the **show crypto ikev2 diagnose error** command in privileged EXEC mode.

show crypto ikev2 diagnose error [count]

Syntax Description

| | |
|--------------|--|
| count | (Optional) Display the error counters from the exit path database. |
|--------------|--|

Command Default

The IKEv2 exit path database is displayed.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|---|
| 15.1(1)T | This command was introduced. |
| Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |

Usage Guidelines

Use this command to display the IKEv2 exit path database. Enable or disable IKEv2 exit path logging using the **crypto ikev2 diagnose error** command. Use the **clear crypto ikev2 diagnose error** command to clear the IKEv2 exit path database.

Examples

The following example is a sample output from the **show crypto ikev2 diagnose error** command. The output is self-explanatory.

```
Router# show crypto ikev2 diagnose error
Exit Path Table - status: enable, current entry 2, deleted 0, max allow 50
Error(1): No pskey found
-Traceback= 0x37ABEB8z 0x37AC29Cz 0x2C0CA74z 0x2C0CA70z
Error(1): No pskey found
-Traceback= 0x37B609Cz 0x37ABEB8z 0x37AC29Cz 0x2C0CA74z 0x2C0CA70z
```

Related Commands

| Command | Description |
|--|--------------------------------------|
| clear crypto ikev2 diagnose error | Clears the IKEv2 exit path database. |
| crypto ikev2 diagnose error | Enables IKEv2 error diagnosis. |

show crypto ikev2 policy

To display the default or a user-defined Internet Key Exchange Version 2 (IKEv2) policy, use the **show crypto ikev2 policy** command in privileged EXEC mode.

```
show crypto ikev2 policy [policy-name]
```

| | |
|---------------------------|--|
| Syntax Description | <i>policy-name</i> (Optional) Displays the specified policy. |
|---------------------------|--|

Command Default If no option is specified, then this command displays all the policies.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|------------------------|---------------------------|--|
| | 15.1(1)T | This command was introduced. |
| | 15.1(4)M | This command was modified. The command output was updated to support IPv6 addresses. |
| | Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |
| | 15.2(4)S | This command was integrated into Cisco IOS Release 15.2(4)S. |

Usage Guidelines Use this command to display the default or user-defined IKEv2 policy. User-defined policies display the default values of the commands that are not explicitly configured under the policy.

Examples

The following examples show the output for a default and user-defined policy.

Default IKEv2 Policy

The default IKEv2 policy matches all local addresses in global VRF and uses the default IKEv2 proposal.

```
Router# show crypto ikev2 policy default
IKEv2 policy : default
  Match fvrf   : global
  Match address local : any
  Proposal     : default
Router# show crypto ikev2 policy default
```

This sample output shows the default IKEv2 policy that matches the local IPv6 address in global VRF: IKEv2 policy : default

```
Match fvrf   : global
Match address local : 2001:DB8:1::1
Proposal     : default
```

User-defined IKEv2 policy

```
Router# show crypto ikev2 policy policy-1
IKEv2 policy : policy-1
Match fvrf : green
Match local : 10.0.0.1
Proposal    : proposal-A
Proposal    : proposal-B
```

The table below describes the significant fields shown in the display.

Table 12: show crypto ikev2 policy Field Descriptions

| Field | Description |
|--------------|---|
| IKEv2 policy | Name of the IKEv2 policy. |
| Match fvrf | The front door virtual routing and forwarding (FVRF) specified for matching the IKEv2 policy. |
| Match local | The local IP address (IPv4 or IPv6) assigned for matching the IKEv2 policy. |
| Proposal | The name of the proposal that is attached to the IKEv2 policy. |

Related Commands

| Command | Description |
|-----------------------------|--|
| crypto ikev2 policy | Defines an IKEv2 policy. |
| crypto ikev2 proposal | Defines an IKE proposal. |
| match (ikev2 policy) | Matches an IKEv2 policy based on the parameters. |
| proposal | Specifies the proposals that must be used in the IKEv2 policy. |

show crypto ikev2 profile

To display a user-defined Internet Key Exchange Version 2 (IKEv2) profile, use the **show crypto ikev2 profile** command in privileged EXEC mode.

```
show crypto ikev2 profile [profile-name]
```

Syntax Description

| | |
|---------------------|---------------------------------------|
| <i>profile-name</i> | (Optional) Name of the IKEv2 profile. |
|---------------------|---------------------------------------|

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|--|
| 15.1(1)T | This command was introduced. |
| 15.1(4)M | This command was modified. The command output was updated to support IPv6 addresses. |
| Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |

Usage Guidelines

Use this command to display information about an IKEv2 profile. This command also displays the default values of the commands that are not explicitly configured in the IKEv2 profile. If a profile name is not specified, the command displays all the user-defined IKEv2 profiles.

Examples

The following example is sample output from the **show crypto ikev2 profile** command:

```
Router# show crypto ikev2 profile
IKEv2 profile: prof
Ref Count: 3
Match criteria:
  Fvrf: any
  Local address/interface: none
Identities:
  fqdn smap-initiator
Certificate maps: none
Local identity: fqdn dmap-responder
Remote identity: none
Local authentication method: pre-share
Remote authentication method(s): pre-share
Keyring: v2-kr1
Trustpoint(s): none
Lifetime: 86400 seconds
DPD: disabled
NAT-keepalive: disabled
Ivrf: global
Virtual-template: none
Accounting mlist: none
```

The table below describes the significant fields shown in the display.

Table 13: show crypto ikev2 profile Field Descriptions

| Field | Description |
|------------------------------|---|
| IKEv2 profile | Name of the IKEv2 profile. |
| Match | The match parameter in the profile. |
| Local Identity | The local identity type. |
| Local authentication method | The local authentication methods. |
| Remote authentication method | The remote authentication methods. |
| Keyring | The keyring specified in the profile. |
| Trustpoint | The trustpoints used in the Rivest, Shamir and Adleman (RSA) signature authentication method. |
| Lifetime | The lifetime of the IKEv2 profile. |
| DPD | The status of Dead Peer Detection (DPD). |
| Ivrf | The Inside VRF (IVRF) in the profile. |
| Virtual-template | The virtual template in the profile. |

show crypto ikev2 proposal

To display the Internet Key Exchange Version 2 (IKEv2) proposal, use the **show crypto ikev2 proposal** command in privileged EXEC mode.

```
show crypto ikev2 proposal [{namedefault}]
```

Syntax Description

| | |
|---------|---------------------------------------|
| name | (Optional) The user-defined proposal. |
| default | (Optional) The default proposal. |

Command Default

If no option is specified, the default and user-defined proposals are displayed.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|--|
| 15.1(1)T | This command was introduced. |
| Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |
| 15.2(4)S | This command was integrated into Cisco IOS Release 15.2(4)S. |

Usage Guidelines

Use this command to display the user-defined and default proposals.

Examples

The following example is a sample output from the **show crypto ikev2 proposal** command:

```
Router# show crypto ikev2 proposal
IKEv2 proposal: pr1
  Encryption : 3DES AES-CBC-192
  Integrity  : MD596
  PRF       : MD5
  DH Group  : DH_GROUP_768_MODP/Group 1 DH_GROUP_1536_MODP/Group 5
IKEv2 proposal: default
  Encryption : AES-CBC-128 3DES
  Integrity  : SHA96 MD596
  PRF       : SHA1 MD5
  DH Group  : DH_GROUP_1536_MODP/Group 5 DH_GROUP_1024_MODP/Group 2
```

The table below describes the significant fields shown in the display.

Table 14: show crypto ikev2 proposal Field Descriptions

| Field | Description |
|----------------|--|
| IKEv2 proposal | Name of the proposal. |
| Encryption | The encryption algorithm configured in the proposal. |
| Integrity | The integrity algorithm configured in the proposal. |

| Field | Description |
|----------|--|
| PRF | The Pseudo-Random Function in the proposal. This is the same as the integrity algorithm. |
| DH Group | The Diffie-Hellman groups configured in the proposal. |

Related Commands

| Command | Description |
|------------------------------------|--|
| crypto ikev2 proposal | Defines an IKEv2 proposal. |
| encryption (ikev2 proposal) | Specifies the encryption algorithm in an IKEv2 proposal. |
| group (ikev2 proposal) | Specifies the DH groups in an IKEv2 proposal. |
| integrity (ikev2 proposal) | Specifies the integrity algorithm in an IKEv2 proposal. |

show crypto ikev2 sa

To display an Internet Key Exchange Version 2 (IKEv2) security associations (SA), use the **show crypto ikev2 sa** command in privileged EXEC mode.

```
show crypto ikev2 sa {local [{ipv4-address|ipv6-address}] | remote [{ipv4-address|ipv6-address}] |
fvrfrf vrf-name} [detailed]
```

| Syntax Description | | |
|---|--|--|
| local [ipv4-address ipv6-address] | | Displays current IKEv2 SAs that match the local IP address. |
| remote [ipv4-address ipv6-address] | | Displays current IKEv2 SAs that match the remote IP address. |
| fvrfrf vrf-name | | Displays current IKEv2 SAs that match the specified forward virtual routing and forwarding (FVRF). |
| detailed | | (Optional) Displays detailed information about current SAs. |

Command Default All current IKEv2 security associations are displayed.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|---------------------------|---|
| | 15.1(1)T | This command was introduced. |
| | 15.1(4)M | This command was modified. The command output was updated to support IPv6 addresses. |
| | Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |
| | 15.2(4)M | This command was modified. The output for the detailed keyword was enhanced to include information about the IKEv2 redirect mechanism. |
| | 15.2(4)S | This command was integrated into Cisco IOS Release 15.2(4)S. |

Usage Guidelines Use this command to display information about the current IKEv2 security associations.

Examples The following is sample output from the **show crypto ikev2 sa** command:

```
Device# show crypto ikev2 sa
Tunnel-id  Local          Remote          fvrfrf/ivrf      Status
2          10.0.0.1/500    10.0.0.2/500    (none)/(none)    READY
           Encr: 3DES, Hash: SHA96, DH Grp:2, Auth: PSK
           Life/Active Time: 86400/361 sec
Device# show crypto ikev2 sa
Tunnel-id  Local          Remote          fvrfrf/ivrf      Status
```

```

1  2001:DB8:0::1/500    2001:DB8:0::2/500    (none)/(none)    READY
   Encr: 3DES, Hash: SHA96, DH Grp:2, Auth: PSK
   Life/Active Time: 86400/361 sec

```

The following is sample output from the **show crypto ikev2 sa detailed** command:

```

Device# show crypto ikev2 sa detailed
Tunnel-id  Local          Remote          fvrf/ivrf      Status
2          10.0.0.1/500  10.0.0.2/500   (none)/(none)  READY
   Encr: 3DES, Hash: SHA96, DH Grp:2, Auth: PSK
   Life/Active Time: 86400/479 sec
   CE id: 0, Session-id: 2, MIB-id: 2
   Status Description: Negotiation done
   Local spi: BCF1453548BE731C    Remote spi: 85CB158F05817B3A
   Local id: 10.0.0.1              Remote id: 10.0.0.2
   Local req mess id: 3             Remote req mess id: 0
   Local next mess id: 3           Remote next mess id: 1
   Local req queued: 3             Remote req queued: 0
   Local window: 5                 Remote window: 5
   DPD configured for 0 seconds
   NAT-T is not detected
   Redirected From: 10.1.1.100

```

The table below describes the significant fields shown in the display.

Table 15: show crypto ikev2 sa detailed Field Descriptions

| Field | Description |
|--------------------|--|
| Tunnel-id | Unique identifier of the IKEv2 tunnel. |
| Local | IP address (IPv4 or IPv6) and UDP port of the local IKEv2 endpoint. |
| Remote | IP address (IPv4 or IPv6) and UDP port of the remote IKEv2 endpoint. |
| fvrf/ivrf | Forward VRF (FVRF)/Inside VRF (IVRF) of the local IKEv2 endpoint. |
| Status | Status of the IKEv2 tunnel. |
| Encr | Encryption algorithm used by the IKEv2 tunnel. |
| Hash | Integrity algorithm used by the IKEv2 tunnel. |
| DH Grp | Diffie-Hellman (DH) group used by the IKEv2 tunnel. |
| Auth Sign | Authentication method used by the local IKEv2 endpoint. |
| Auth Verify | Authentication method used by the remote IKEv2 endpoint. |
| Life/Active Time | Total and active times of the IKEv2 tunnel. |
| CE id | Crypto engine (CE) ID used by the local IKEv2 endpoint. |
| Session-id | Session ID for the IKEv2 tunnel. |
| MIB-id | MIB identifier for the IKEv2 tunnel. |
| Status Description | Description of the IKEv2 tunnel status. |

| Field | Description |
|---------------------|---|
| Local spi | IKEv2 security parameter index (SPI) of the local IKEv2 endpoint. |
| Remote spi | IKEv2 SPI of the remote IKEv2 endpoint. |
| Local id | IKEv2 identity of the local IKEv2 endpoint. |
| Remote id | IKEv2 identity of the remote IKEv2 endpoint. |
| Local req mess id | Message ID of the last IKEv2 request sent. |
| Remote req mess id | Message ID of the last IKEv2 request received. |
| Local next mess id | Message ID of the next IKEv2 request to be sent. |
| Remote next mess id | Message ID of the next IKEv2 request to be received. |
| Local req queued | Number of requests that are queued to be sent. |
| Remote req queued | Number of requests that are queued to be processed. |
| Local window | IKEv2 window size of the local IKEv2 endpoint. |
| Remote window | IKEv2 window size of the remote IKEv2 endpoint. |
| DPD | Dead Peer Detection (DPD) interval. |
| NAT_T | Network Address Translation (NAT) detection status. |
| Redirected From | IP address from which the request was redirected. |

show crypto ikev2 session

To display the status of active Internet Key Exchange Version 2 (IKEv2) sessions, use the **show crypto ikev2 session** command in privileged EXEC mode.

show crypto ikev2 session [detailed]

Syntax Description

| | |
|-----------------|---|
| detailed | (Optional) Displays detailed information about the session. |
|-----------------|---|

Command Default

The session information is displayed in a brief format.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|--|
| 15.1(1)T | This command was introduced. |
| 15.1(4)M | This command was modified. The command output was updated to support IPv6 addresses. |
| Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |

Usage Guidelines

Use this command to display information about the active IKEv2 sessions. Use the **detailed** keyword to display information about IKEv2 parent and child security associations.

Examples

The following is a sample output from the **show crypto ikev2 session** and **show crypto ikev2 session detailed** command.

```
Router# show crypto ikev2 session
Session-id:4, Status:UP-ACTIVE, IKE count:1, CHILD count:1

Tunnel-id Local Remote fvrf/ivrf Status
1 10.10.10.1/500 20.20.20.1/500 none/none READY
Encr: AES-CBC, keysize: 256, PRF: SHA512, Hash: SHA512, DH Grp:19, Auth sign: PSK,
Auth verify: PSK
Life/Active Time: 86400/93 sec
CE id: 1004, Session-id: 4
Local spi: 392B7A3F58F8E75D Remote spi: C700105C311A80FE
Child sa: local selector 0.0.0.0/0 - 255.255.255.255/65535
remote selector 0.0.0.0/0 - 255.255.255.255/65535
ESP spi in/out: 0xED36856/0xD0EDF99E
```

```
Router# show crypto ikev2 session detailed
Session-id:4, Status:UP-ACTIVE, IKE count:1, CHILD count:1

Tunnel-id Local Remote fvrf/ivrf Status
1 10.10.10.1/500 20.20.20.1/500 none/none READY
Encr: AES-CBC, keysize: 256, PRF: SHA512, Hash: SHA512, DH Grp:19, Auth sign: PSK,
Auth verify: PSK
Life/Active Time: 86400/96 sec
CE id: 1004, Session-id: 4
Local spi: 392B7A3F58F8E75D Remote spi: C700105C311A80FE
```



```

Status Description: Negotiation done
Local id: 10.10.10.1
Remote id: 20.20.20.1
Local req msg id: 0           Remote req msg id: 4
Local next msg id: 0         Remote next msg id: 4
Local req queued: 0          Remote req queued: 4
Local window: 5              Remote window: 5
DPD configured for 0 seconds, retry 0
Fragmentation not configured.
Dynamic Route Update: enabled
Extended Authentication not configured.
NAT-T is not detected
Cisco Trust Security SGT is disabled
Initiator of SA : No
Child sa: local selector 0.0.0.0/0 - 255.255.255.255/65535
          remote selector 0.0.0.0/0 - 255.255.255.255/65535
          ESP spi in/out: 0xED36856/0xD0EDF99E
          AH spi in/out: 0x0/0x0
          CPI in/out: 0x0/0x0
          Encr: AES-CBC, keysize: 128, esp_hmac: SHA96
          ah_hmac: None, comp: IPCOMP_NONE, mode tunnel

```

The table below describes the significant fields shown in the display.

Table 16: show crypto ikev2 session detailed Field Descriptions

| Field | Description |
|--------------------|---|
| Tunnel id | Unique identifier of IKEv2 tunnel. |
| Local | IP address (IPv4 or IPv6) and UDP port of the local IKEv2 endpoint. |
| Remote | IPv4 or IPv6 address and UDP port of the remote IKEv2 endpoint. |
| fvr/f/ivrf | FVRF/IVRF of the local IKEv2 endpoint. |
| Status | Status of the IKEv2 tunnel. |
| Encr | Encryption algorithm used by the IKEv2 tunnel. |
| Hash | Integrity algorithm used by the IKEv2 tunnel. |
| DH Grp | DH group used by the IKEv2 tunnel. |
| Auth Sign | Authentication method used by the local IKEv2 endpoint. |
| Auth Verify | Authentication method used by the remote IKEv2 endpoint. |
| Life/Active Time | The total and active lifetime of the IKEv2 tunnel. |
| CE id | The crypto engine ID used by the local IKEv2 endpoint. |
| Session-id | The session ID for the IKEv2 tunnel. |
| MIB-id | The MIB identifier for the IKEv2 tunnel. |
| Status Description | Description of the IKEv2 tunnel status. |
| Local spi | IKEv2 security parameter index (SPI) of the local IKEv2 endpoint. |

| Field | Description |
|--------------------------|--|
| Remote spi | IKEv2 SPI of the remote IKEv2 endpoint. |
| Local id | IKEv2 identity of the local IKEv2 endpoint |
| Remote id | IKEv2 identity of the remote IKEv2 endpoint. |
| Local req mess id | Message ID of the last IKEv2 request sent. |
| Remote req mess id | Message ID of the last IKEv2 request received. |
| Local next mess id | Message ID of the next IKEv2 request to be sent. |
| Remote next mess id | Message ID of the next IKEv2 request to be received. |
| Local req queued | Number of requests queued to be sent. |
| Remote req queued | Number of requests queued to be processed. |
| Local window | IKEv2 window size of the local IKEv2 endpoint. |
| Remote window | IKEv2 window size of the remote IKEv2 endpoint. |
| DPD | DPD interval. |
| NAT | NAT detection status. |
| Child sa: local selector | Local network protected by the child security association (SA). |
| remote selector | Remote network protected by the child SA. |
| ESP spi in/out | Inbound and outbound SPI of the Encapsulating Security Payload (ESP) child SA. |
| CPI in/out | Inbound and outbound Cisco Product Identification (CPI) of the IP compression (IPComp) child SA. |
| AH spi in/out | Inbound and outbound SPI of the Authentication Header (AH) child SA. |
| Encr | Encryption algorithm used by the ESP child SA. |
| keysize | Size of the key in bits used by the encryption algorithm. |
| esp_hmac | Integrity algorithm used by the ESP child SA. |
| ah_hmac | Integrity algorithm used in the AH child SA, if available. |
| comp | Compression algorithm used by IPComp child SA. |
| mode | Tunnel or transport mode used by ESP/AH child SA. |

show crypto ikev2 stats

To display Internet Key Exchange Version 2 (IKEv2) security association (SA) statistics, use the **show crypto ikev2 stats** command in privileged EXEC mode.

```
show crypto ikev2 stats [{exchange [{detailed}]} | ext-service | priority-queue | timeout | reconnect}]
```

| Syntax Description | exchange | (Optional) Displays information about IKEv2 exchange and notification statistics. |
|--------------------|----------------|---|
| | detailed | (Optional) Displays detailed information about IKEv2 exchange and notification statistics. |
| | ext-service | (Optional) Displays information about pass and fail counters for IKEv2 external services. |
| | priority-queue | (Optional) Displays information about the current size and the historical peak of the IKEv2 priority queue. |
| | timeout | (Optional) Displays information about the number of timeouts in IKEv2 internal timers. |
| | reconnect | (Optional) Displays information about the IKEv2 reconnect security associations. |

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|----------------------------|--|
| | 15.1(1)T | This command was introduced. |
| | Cisco IOS XE Release 3.3S | This command was integrated into Cisco IOS XE Release 3.3S. |
| | 15.2(4)S | This command was modified. The output of this command was enhanced to include the default IKEv2 maximum in-negotiation Call Admission Control (CAC) counter. |
| | 15.3(2)T | This command was modified. The exchange , detailed , ext-service , priority-queue , and timeout keywords were added. |
| | 15.4(1)T | This command was modified. The reconnect keyword was added. |
| | Cisco IOS XE Release 3.11S | This command was integrated into Cisco IOS XE Release 3.11S. |

Usage Guidelines When you execute this command, the statistics are generated from the time of system start up or the last execution of the **clear** command whichever happened last.

If you use the **detailed** keyword in the **show crypto ikev2 stats exchange** command, the output displays information about all exchanges and notifications (including fields that have a value of zero).

External services are service requests that IKEv2 makes to other components, such as, IPsec, public key infrastructure (PKI), authentication, authorization, and accounting (AAA), and crypto engine.

IKEv2 priority queue is an internal data structure for storing incoming requests made to IKEv2 process. Historical peak value is the highest value of the priority queue over a period of time.

IKEv2 timers are internal programs that help IKEv2 to perform tasks on time or result in a timeout when the task exceeds the specified time limit.



Note In the output of "show crypto ikev2 stats" command, the active SAs show the sum total of IKEv2 SAs in READY state plus the IKEv2 SAs in DELETE state (marked for deletion SAs). Starting from release 16.8.1 a new counter called "Marked For Deletion SAs" was introduced, to show SAs that are about to be deleted. Hence "Active SAs" counter will show actual active IKEv2 SAs count.

Examples

The following is a sample output from the **show crypto ikev2 sa** command:

```
ISR-Bundle2# show crypto ikev2 sa | count READY
Number of lines which match regexp = 224
```

```
ISR-Bundle2# show crypto ikev2 sa | count DELETE
Number of lines which match regexp = 276
```

The following is a sample output from the **show crypto ikev2 stats** command:

```
Device(#) show crypto ikev2 stats
```

```
-----
                        Crypto IKEV2 SA Statistics
-----
System Resource Limit:  0          Max IKEv2 SAs: 0          Max in nego: 40
Total IKEv2 SA Count:  0          active: 0              negotiating: 0
Incoming IKEv2 Requests: 0        accepted: 0            rejected: 0
Outgoing IKEv2 Requests: 0        accepted: 0            rejected: 0
Rejected IKEv2 Requests: 0        rsrc low: 0           SA limit: 0
IKEv2 packets dropped at dispatch: 0
Incoming IKEV2 Cookie Challenged Requests: 0
    accepted: 0          rejected: 0          rejected no cookie: 0
```

The following table describes the significant fields shown in the display:

Table 17: show crypto ikev2 stats Field Descriptions

| Field | Description |
|-------------------------|---|
| System Resource Limit | Percentage of system resources that a router is using before IKEv2 starts dropping all SA requests. |
| Max IKEv2 SAs | Number of active IKEv2 SA requests allowed on the router. |
| Max in nego | Default IKEv2 maximum in-negotiation CAC counter. |
| Total IKEv2 SA Count | Number of IKEv2 SAs. |
| active | Number of active SAs. |
| negotiating | Number of SA requests being negotiated. |
| Incoming IKEv2 Requests | Number of incoming IKEv2 SA requests. |
| accepted | Number of accepted IKEv2 SA requests. |

| Field | Description |
|---|--|
| rejected | Number of rejected incoming IKEv2 SA requests. |
| Outgoing IKEv2 Requests | Number of outgoing IKEv2 SA requests. |
| accepted | Number of accepted outgoing IKEv2 SA requests. |
| rejected | Number of rejected outgoing IKEv2 SA requests. |
| Rejected IKEv2 Requests | Number of IKEv2 requests that were rejected. |
| rsrc low | Number of IKEv2 requests that were rejected because system resources were low or the preconfigured system resource limit was exceeded. |
| SA limit | Number of IKEv2 SA requests that were rejected because the SA limit was reached. |
| IKEv2 packets dropped at dispatch | Number of IKEv2 packets dropped in transit. |
| Incoming IKEv2 Cookie Challenged Requests | Number of incoming IKEv2 cookie requests. |
| accepted | Number of accepted incoming IKEv2 cookie requests. |
| rejected | Number of rejected incoming IKEv2 cookie requests. |
| rejected no cookie | Number of incoming IKEv2 cookie requests rejected because the request did not contain cookies. |

The following is a sample output from the **show crypto ikev2 stats exchange** command:

```

Device (#) show crypto ikev2 stats exchange
-----
EXCHANGE/NOTIFY          TX (REQ)   TX (RES)   RX (REQ)   RX (RES)

EXCHANGES

IKE_SA_INIT              1           0           0           1
IKE_AUTH                 1           0           0           1
CREATE_CHILD_SA          3           0           0           3
CREATE_CHILD_SA_IPSEC_REKEY 1           0           0           1
CREATE_CHILD_SA_IKE_REKEY 2           0           0           2
INFORMATIONAL            3           0           0           3

ERROR NOTIFY

OTHER NOTIFY

INITIAL_CONTACT          1           0           0           0
SET_WINDOW_SIZE          3           0           0           3
NAT_DETECTION_SOURCE_IP  1           0           0           1
NAT_DETECTION_DESTINATION_IP 1           0           0           1
HTTP_CERT_LOOKUP_SUPPORTED 1           0           0           1
REKEY_SA                 1           0           0           0

```

```

CONFIG PAYLOAD TYPE          TX      RX
CFG_REQUEST                  1       0
    
```

```

OTHER COUNTERS
NO_NAT 1
-----
    
```

The following table describes the significant fields shown in the display:



Note **REKEY_SA** only shows the number of rekey requests sent on the transmitter side (Tx) and the number of rekey requests received on the receiver side (Rx).

CREATE_CHILD_SA_IPSEC_REKEY enables the Tx request to be sent or Rx request to be received, and the Tx response to be received or Rx response to be received.

Table 18: show crypto ikev2 stats exchange Field Descriptions

| Field | Description |
|------------------------------|---|
| EXCHANGE/NOTIFY | Type of information—exchange or notification. |
| TX (REQ) | Transmitted request. |
| TX (RES) | Transmitted response. |
| RX (REQ) | Received request. |
| RX (RES) | Received response. |
| EXCHANGES | IKEv2 exchanges. |
| IKE_SA_INIT | Number of IKE SA initiation requests. |
| ERROR NOTIFY | Number of error notifications. |
| OTHER NOTIFY | Number of other notifications. |
| NAT_DETECTION_SOURCE_IP | Number of IP addresses containing source Network Address Translation (NAT). |
| NAT_DETECTION_DESTINATION_IP | Number of IP addresses containing destination NAT. |
| CONFIG PAYLOAD TYPE | Configuration payload type. |
| OTHER COUNTERS | Exchanges or notifications that cannot be classified in the above fields. |

The following is a sample output from the **show crypto ikev2 stats ext-service** command:

```

Device(#) show crypto ikev2 stats ext-service
-----
AAA OPERATION          PASSED    FAILED
-----
RECEIVING PSKEY              0         0
    
```

```

AUTHENTICATION USING EAP                0          0
START ACCOUNTING                         0          0
STOP ACCOUNTING                          0          0
AUTHORIZATION                             0          0
-----
IPSEC OPERATION                          PASSED     FAILED
-----
IPSEC POLICY VERIFICATION                 0          0
SA CREATION                              0          0
SA DELETION                              0          0
-----
CRYPTO ENGINE OPERATION                   PASSED     FAILED
-----
DH PUBKEY GENERATED                      7723       0
DH SHARED SECKEY GENERATED              0          0
SIGNATURE SIGN                           0          0
SIGNATURE VERIFY                          0          0
-----
PKI OPERATION                            PASSED     FAILED
-----
VERIFY CERTIFICATE                       0          0
FETCHING CERTIFICATE USING HTTP           0          0
FETCHING PEER CERTIFICATE USING HTTP      0          0
GET ISSUERS                              0          0
GET CERTIFICATES FROM ISSUERS             0          0
GET DN FROM CERT                          0          0
    
```

The following table describes the significant fields shown in the display:

Table 19: show crypto ikev2 stats ext-service Field Descriptions

| Field | Description |
|---------------------------|--|
| AAA OPERATION | Indicates service requests sent for AAA. |
| PASSED | Indicates the number of requests that passed. |
| FAILED | Indicates the number of requests that failed. |
| RECEIVING PSKEY | Denotes the number of requests that passed or failed when a preshared key was requested from AAA. |
| AUTHENTICATION USING EAP | Denotes the number of requests that passed or failed when authenticating using Extensible Authentication Protocol (EAP). |
| START ACCOUNTING | Denotes the number of requests that passed or failed when AAA was requested to stop accounting. |
| STOP ACCOUNTING | Denotes the number of requests that passed or failed when AAA was requested to start accounting. |
| IPSEC OPERATION | Indicates service requests sent to IPsec. |
| IPSEC POLICY VERIFICATION | Denotes the number of requests that passed or failed during IPsec policy verification. |
| SA CREATION | Denotes the number of requests that passed or failed during IPsec SA creation. |

| Field | Description |
|--------------------------------------|--|
| SA DELETION | Denotes the number of requests that passed or failed during IPsec SA deletion. |
| CRYPTO ENGINE OPERATION | Indicates service requests sent to crypto engine. |
| DH PUBKEY GENERATED | Denotes the number of requests made (passed or failed) to the crypto engine to generate Diffie-Hellman (DH) public keys. |
| DH SHARED SECKEY GENERATED | Denotes the number of requests made (passed or failed) to the crypto engine to generate DH shared secret keys. |
| SIGNATURE SIGN | Denotes the number of requests made (passed or failed) to the crypto engine to sign the signature. |
| SIGNATURE VERIFY | Denotes the number of requests made (passed or failed) to the crypto engine to verify the signature. |
| PKI OPERATION | Indicates the service request sent to PKI. |
| VERIFY CERTIFICATE | Denotes the number of requests that passed or failed when requesting PKI to verify certificates. |
| FETCHING CERTIFICATE USING HTTP | Denotes the number of requests that passed or failed when requesting PKI to fetch certificates using HTTP. |
| FETCHING PEER CERTIFICATE USING HTTP | Denotes the number of requests that passed or failed when requesting PKI to fetch peer certificates using HTTP. |
| GET ISSUERS | Denotes the number of requests that passed or failed when requesting PKI to get issuers. |
| GET CERTIFICATES FROM ISSUERS | Denotes the number of requests that passed or failed when requesting PKI to get certificates from issuers. |
| GET DN FROM CERT | Denotes the number of requests that passed or failed when requesting PKI to fetch the distinguished name (DN) through the certificate authentication method. |

The following is a sample output from the **show crypto ikev2 stats priority-queue** command:

```
Device(#) show crypto ikev2 stats priority-queue
-----
IKEV2 PRIORITY QUEUE          SIZE      PEAK
-----
HIGHEST                        0          2
HIGHER                         0          0
HIGH                          0          0
NORMAL                        0          1
LOW                            0          0
LOWER                         0          0
LOWEST                        0          1
```

The following table shows significant fields shown in the display.

Table 20: show crypto ikev2 stats priority-queue Field Descriptions

| Field | Description |
|----------------------|--|
| IKEV2 PRIORITY QUEUE | IKEv2 priority queue, which ranges from highest to lowest. |
| SIZE | Size of the priority queue. |
| PEAK | Historical peak of the priority queue. |

The following is a sample output from the **show crypto ikev2 stats timeout** command:

```
Device(#) show crypto ikev2 stats timeout
-----
IKEV2 TIMER                                TIMED OUT
-----
EXT SERVICE TIMER                          0
AUTH TIMER                                  0
PACKET MAXIMUM RETRANS TIMER                7736
DPD MAX RETRANS TIMER                       0
```

The following table shows significant fields shown in the display.

Table 21: show crypto ikev2 stats timeout Field Descriptions

| Field | Description |
|------------------------------|--|
| IKEV2 TIMER | IKEv2 timer. |
| EXT SERVICE TIMER | Timer to ensure external services completes the service within the specified time. |
| AUTH TIMER | Timer to ensure that IKEv2 authorization is completed within the specified time. |
| PACKET MAXIMUM RETRANS TIMER | Timeouts that occurred when retransmitting the packets. |
| DPD MAX RETRANS TIMER | Timeouts that occurred when retransmitting the dead peer detection. |

Related Commands

| Command | Description |
|---------------------------------|-----------------------------|
| clear crypto ikev2 stats | Clears IKEv2 SA statistics. |

show crypto ipsec client ezvpn

To display the Cisco Easy VPN Remote configuration, use the **show crypto ipsec client ezvpn** command in privileged EXEC mode.

show crypto ipsec client ezvpn

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 12.2(4)YA | This command was introduced on Cisco 806, Cisco 826, Cisco 827, and Cisco 828 routers; Cisco 1700 series routers; and Cisco uBR905 and Cisco uBR925 cable access routers. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS 12.2SX family of releases. Support in a specific 12.2SX release is dependent on your feature set, platform, and platform hardware. |

Examples

The following example shows a typical display from the **show crypto ipsec client ezvpn** command for an active Virtual Private Network (VPN) connection when the router is in client mode. The last two lines indicate that a configuration URL and configuration version number have been pushed through the Mode-Configuration Exchange by the server to the Easy VPN remote device.

```
Router# show crypto ipsec client ezvpn

Tunnel name: hwl
Inside interface list: FastEthernet0/0, Serial1/0,
Outside interface: Serial0/0
Current State: IPSEC_ACTIVE
Last Event: SOCKET_UP
Address: 192.168.201.0
Mask: 255.255.255.224
DNS Primary: 192.168.201.1
DNS Secondary: 192.168.201.2
NBMS/WINS Primary: 192.168.201.3
NBMS/WINS Secondary: 192.168.201.4
Default Domain: cisco.com
Configuration URL: http://10.8.8.88/easy.cfg
Configuration Version: 10
```

The following example shows a typical display from the **show crypto ipsec client ezvpn** command for an active VPN connection when the router is in network-extension mode:

```
Router# show crypto ipsec client ezvpn

Tunnel name: hwl
Inside interface list: FastEthernet0/0, Serial1/0,
```

```

Outside interface: Serial10/0
Current State: IPSEC_ACTIVE
Last Event: SOCKET_UP
Address: 192.168.202.128
Mask: 255.255.255.224
Default Domain: cisco.com
Split Tunnel List: 1
    Address      : 192.168.200.225
    Mask         : 255.255.255.224
    Protocol     : 0x0
    Source Port  : 0
    Dest Port    : 0

```

The following example shows a typical display from the **show crypto ipsec client ezvpn** command for an inactive VPN connection:

```

Router# show crypto ipsec client ezvpn

Current State: IDLE
Last Event: REMOVE INTERFACE CFG
Router#

```

The following example displays information about the outside interface "Virtual-Access1", which is bound to the real interface (Ethernet0/0) on which the user has configured Easy VPN as an outside interface:

```

Router# show crypto ipsec client ezvpn
Easy VPN Remote Phase: 5
Tunnel name : ez
Inside interface list: Ethernet1/0,
Outside interface: Virtual-Access1 (bound to Ethernet0/0)
Easy VPN connect ACL checking active
Connect : ACL based with access-list 101
Current State: CONNECT_REQUIRED
Last Event: TRACKED_OBJECT_UP
Save Password: Disallowed
Current EzVPN Peer: 10.0.0.2

```

The table below describes significant fields shown by the **show crypto ipsec client ezvpn** command:

Table 22: show crypto ipsec client ezvpn Field Descriptions

| Field | Description |
|---------------|--|
| Current State | Displays whether the VPN tunnel connection is active or idle. Typically, when the tunnel is up, the current state is IPSEC ACTIVE. |
| Last Event | Displays the last event performed on the VPN tunnel. Typically, the last event before a tunnel is created is SOCKET UP. |
| Address | Displays the IP address used on the outside interface. |
| Mask | Displays the subnet mask used for the outside interface. |
| DNS Primary | Displays the primary domain name system (DNS) server provided by the Dynamic Host Configuration Protocol (DHCP) server. |
| DNS Secondary | Displays the secondary DNS server provided by the DHCP server. |

| Field | Description |
|---------------------|---|
| Domain Name | Displays the domain name provided by the DHCP server. |
| NBMS/WINS Primary | Displays the primary NetBIOS Microsoft Windows Name Server provided by the DHCP server. |
| NBMS/WINS Secondary | Displays the secondary NetBIOS Microsoft Windows Name Server provided by the DHCP server. |

Related Commands

| Command | Description |
|------------------------------------|---|
| show crypto ipsec transform | Displays the specific configuration for one or all transformation sets. |

show crypto ipsec transform-set default

To display the default IP Security (IPsec) transform sets currently in use by Internet Key Exchange (IKE), use the **show crypto ipsec transform-set default** command in privileged EXEC mode.

show crypto ipsec transform-setdefault

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines

If the default transform sets are in use, the **show crypto ipsec default transform-set** command displays the two default transform sets each of which defines an Encapsulation Security Protocol (ESP) encryption transform type and an ESP authentication transform type.

Examples

The following example displays the two default transform sets. No user defined transform sets have been configured, the default transform sets have not been disabled, and the crypto engine supports the encryption algorithm.

```
Router# show crypto ipsec default transform-set

Transform set #$/default_transform_set_1: { esp-aes esp-sha-hmac }
    will negotiate = { Transport, },

Transform set #$/default_transform_set_0: { esp-3des esp-sha-hmac }
    will negotiate = { Transport, },
```

Table 23: show crypto ipsec default transform-set Field Descriptions

| Default Transform Name | ESP Encryption Transform and Description | ESP Authentication Transform and Description |
|----------------------------|--|---|
| \$/default_transform_set_1 | esp-aes (ESP with the 128-bit Advanced Encryption Standard [AES] encryption algorithm) | esp-sha-hmac (ESP with the Secure Hash Algorithm [SHA-1, HMAC variant] authentication algorithm) |
| \$/default_transform_set_0 | esp-3des (ESP with the 168-bit Triple Data Encryption Standard [3DES or Triple DES] encryption algorithm) | esp-sha-hmac |

The following example shows that when the default transform sets are disabled with the **no crypto ipsec default transform-set**, the **show crypto ipsec default transform-set** has no output.

```
Router(config)# no crypto ipsec default transform-set
Router(config)# exit
Router#
Router# show crypto ipsec default transform-set

Router#
```

Related Commands

| Command | Description |
|--|---|
| crypto ipsec transform-set | Defines a transform set. |
| show crypto ipsec transform-set | Displays the configured transform sets. |
| show crypto map (IPsec) | Displays the crypto map configuration. |

show crypto ipsec sa

To display the settings used by IPsec security associations (SAs), use the **show crypto ipsec sa** command in privileged EXEC mode.

```
show crypto ipsec sa [{active | address | detail | identity [detail] | interface type number [{detail |
ipv6 [detailed] | interface type number [detailed]]} | ipv6 [interface typenumber] [detailed] | map
map-name [detail] | peer [{detail | vrf vrf} [{ipv4-address [detail] | ipv6-address [{detail |
platform}}]]}] | standby | vrf vrf [detail];]
```

Syntax Description

| | |
|---|--|
| active | (Optional) Displays high availability (HA)-enabled IPsec SAs that are in the active state. |
| address | (Optional) Displays all existing SAs. The SAs are sorted by the destination address (either the local address or the address of the IPsec remote peer) and then by protocol (Authentication Header [AH] or Encapsulation Security Protocol [ESP]). |
| detail | (Optional) Displays detailed information. |
| identity [detail] | (Optional) Displays only the flow information. SA information is not displayed. |
| interface type number | (Optional) Displays all SAs created for an interface. |
| ipv6 | (Optional) Displays IPv6 IPsec SA information. |
| detailed | (Optional) Displays detailed error counters. |
| platform | (Optional) Displays platform-specific information about the IPsec flow. |
| <i>ipv4-address</i> | (Optional) Displays IPsec SAs for an IPv4 peer. |
| <i>ipv6-address</i> | (Optional) Displays IPsec SAs for an IPv6 peer. |
| map map-name [detail] | (Optional) Displays any existing SAs that were created for the crypto map set using a value for the <i>map-name</i> argument. |
| peer [detail [vrf vrf] [ipv4-address [detail] ipv6-address [detail platform]]] | (Optional) Displays all existing SAs with the peer address. |
| standby | (Optional) Displays HA-enabled IPsec SAs that are in the standby state. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------|------------------------------|
| 11.3T | This command was introduced. |

| Release | Modification |
|---------------------------|---|
| 12.2(13)T | This command was modified. The remote crypto endpt and in use settings fields were modified to support Network Address Translation (NAT) traversal. |
| 12.2(15)T | This command was modified. The interface keyword and the <i>type</i> and <i>number</i> arguments were added. The peer keyword, the vrf keyword, and the <i>fvrif-name</i> argument were added. The address keyword was added to the peer keyword string. The vrf keyword and <i>ivrif-name</i> argument were added. |
| 12.3(11)T | This command was modified. The active and standby keywords were added. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| Cisco IOS XE Release 2.1 | This command was implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |
| Cisco IOS XE Release 3.7S | This command was modified. The platform keyword was added. The output was enhanced to display platform-specific information about the IPsec interface and peer. |
| 15.3(2)T | This command was modified. The output was enhanced on group members (GMs) to display the name of the GDOI group to which each IPsec SA applies and the number of packets that are tagged with Cisco TrustSec security group tags (SGTs) in the outbound and inbound directions. |
| Cisco IOS XE Release 3.9S | This command was modified. The output was enhanced on GMs to display the name of the GDOI group to which each IPsec SA applies and the number of packets that are tagged with SGTs in the outbound and inbound directions. |
| 15.4(1)T | This command was modified. The output was enhanced on GMs to display the name of the GDOI group to which each IPsec SA applies and the number of packets that are tagged with SGTs in the outbound and inbound directions. |

Usage Guidelines

If no keyword is specified, all SAs are displayed. The SAs are sorted first by interface and then by traffic flow (for example, source or destination address, mask, protocol, or port). Within a flow, SAs are listed by protocol (ESP or AH) and direction (inbound or outbound).



Note The IPsec SA maximum transmission unit (MTU) is based on IPsec SA path MTU, not the interface MTU.

The **show crypto ipsec sa interface platform** command for a specific interface type displays the output from the following **show** commands, as listed in the order below:

- **show crypto ipsec sa**
- **show platform hardware qfp active feature ipsec interface**

Examples

The following is sample output from the **show crypto ipsec sa** command:

```
Device# show crypto ipsec sa

interface: Ethernet0/1.1
  Crypto map tag: GetvpnAdvanced, local addr 10.10.1.3
  protected vrf: (none)
  local ident (addr/mask/prot/port): (10.10.1.4/255.255.255.255/0/0)
  remote ident (addr/mask/prot/port): (10.10.0.1/255.255.255.255/0/0)
  Group: GetvpnAdvanced2
  current_peer 0.0.0.0 port 848
    PERMIT, flags={}
  #pkts encaps: 0, #pkts encrypt: 0, #pkts digest: 0
  #pkts decaps: 0, #pkts decrypt: 0, #pkts verify: 0
  #pkts compressed: 0, #pkts decompressed: 0
  #pkts not compressed: 0, #pkts compr. failed: 0
  #pkts not decompressed: 0, #pkts decompress failed: 0
  #send errors 0, #recv errors 0

  local crypto endpt.: 10.10.1.3, remote crypto endpt.: 0.0.0.0
  plaintext mtu 1446, path mtu 1500, ip mtu 1500, ip mtu idb Ethernet0/1.1
  current outbound spi: 0x4A22A261(1243783777)
  PFS (Y/N): N, DH group: none

  inbound esp sas:
    spi: 0x4A22A261(1243783777)
      transform: esp-3des esp-sha-hmac ,
      in use settings ={Tunnel, }
      conn id: 5, flow_id: SW:5, sibling_flags 80000040, crypto map: GetvpnAdvanced
      sa timing: remaining key lifetime (sec): 379
      Kilobyte Volume Rekey has been disabled
      IV size: 8 bytes
      replay detection support: Y
      ecn bit support: Y status: off
      Status: ACTIVE(ACTIVE)

  inbound ah sas:

  inbound pcp sas:

  outbound esp sas:
    spi: 0x4A22A261(1243783777)
      transform: esp-3des esp-sha-hmac ,
      in use settings ={Tunnel, }
      conn id: 6, flow_id: SW:6, sibling_flags 80000040, crypto map: GetvpnAdvanced
      sa timing: remaining key lifetime (sec): 379
      Kilobyte Volume Rekey has been disabled
      IV size: 8 bytes
      replay detection support: Y
      ecn bit support: Y status: off
      Status: ACTIVE(ACTIVE)

  outbound ah sas:

  outbound pcp sas:
```

The following is sample output from the **show crypto ipsec sa detail** command, which displays the number of packets that are tagged with Cisco TrustSec SGTs:

```
Device# show crypto ipsec sa detail

interface: Ethernet0/0
```

```

Crypto map tag: GET, local addr 5.0.0.2
protected vrf: (none)
local ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
remote ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
Group: GET-SGT
.
.
.
#pkts tagged (send): 0, #pkts untagged (rcv): 5

```

The following is sample output from the **show crypto ipsec sa identity detail** command:

```

Device# show crypto ipsec sa identity detail

interface: Tunnell
  Crypto map tag: Tunnell-head-0, local addr 10.5.5.2
  protected vrf: (none)
  local ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
  remote ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
  Group: GET-SGT
  current_peer (none) port 500
    DENY, flags={ident_is_root,}
    #pkts encaps: 0, #pkts encrypt: 0, #pkts digest: 0
    #pkts decaps: 0, #pkts decrypt: 0, #pkts verify: 0
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #pkts no sa (send) 0, #pkts invalid sa (rcv) 0
    #pkts encaps failed (send) 0, #pkts decaps failed (rcv) 0
    #pkts invalid prot (rcv) 0, #pkts verify failed: 0
    #pkts invalid identity (rcv) 0, #pkts invalid len (rcv) 0
    #pkts replay rollover (send): 0, #pkts replay rollover (rcv) 0
    ##pkts replay failed (rcv): 0
    #pkts internal err (send): 0, #pkts internal err (rcv) 0
  protected vrf: (none)
  local ident (addr/mask/prot/port): (10.5.5.2/255.255.255.255/47/0)
  remote ident (addr/mask/prot/port): (10.5.5.1/255.255.255.255/47/0)
  Group: GET-SGT
  current_peer 10.5.5.1 port 500
    PERMIT, flags={origin_is_acl,}
    #pkts encaps: 492923510, #pkts encrypt: 492923510, #pkts digest: 492923510
    #pkts decaps: 492923408, #pkts decrypt: 492923408, #pkts verify: 492923408
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #pkts no sa (send) 55, #pkts invalid sa (rcv) 0
    #pkts encaps failed (send) 0, #pkts decaps failed (rcv) 0
    #pkts invalid prot (rcv) 0, #pkts verify failed: 0
    #pkts invalid identity (rcv) 0, #pkts invalid len (rcv) 0
    #pkts replay rollover (send): 0, #pkts replay rollover (rcv) 0
    ##pkts replay failed (rcv): 0
    #pkts internal err (send): 0, #pkts internal err (rcv) 0

```

The following is sample output from the **show crypto ipsec sa vrf** command:

```

Device# show crypto ipsec sa vrf vpn2

interface: Ethernet1/2
  Crypto map tag: ra, local addr. 172.16.1.1
  protected vrf: vpn2
  local ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)

```

```

remote ident (addr/mask/prot/port): (10.4.1.4/255.255.255.255/0/0)
Group: GET-SGT
current_peer: 10.1.1.1:500
PERMIT, flags={}
#pkts encaps: 0, #pkts encrypt: 0, #pkts digest 0
#pkts decaps: 0, #pkts decrypt: 0, #pkts verify 0
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0
#pkts not decompressed: 0, #pkts decompress failed: 0
#send errors 0, #recv errors 0
local crypto endpt.: 172.16.1.1, remote crypto endpt.: 10.1.1.1
path mtu 1500, media mtu 1500
current outbound spi: 50110CF8
inbound esp sas:
  spi: 0xA3E24AFD(2749516541)
    transform: esp-3des esp-md5-hmac ,
    in use settings ={Tunnel, }
    slot: 0, conn id: 5127, flow_id: 7, crypto map: ra
    sa timing: remaining key lifetime (k/sec): (4603517/3503)
    IV size: 8 bytes
    replay detection support: Y
inbound ah sas:
inbound pcp sas:
outbound esp sas:
  spi: 0x50110CF8(1343294712)
    transform: esp-3des esp-md5-hmac ,
    in use settings ={Tunnel, }
    slot: 0, conn id: 5128, flow_id: 8, crypto map: ra
    sa timing: remaining key lifetime (k/sec): (4603517/3502)
    IV size: 8 bytes
    replay detection support: Y
outbound ah sas:
outbound pcp sas:

```

The following configuration was in effect when the preceding **show crypto ipsec sa vrf** command was issued. The IPsec remote access tunnel was “up” when this command was issued.

```

crypto dynamic-map vpn1 1
  set transform-set vpn1
  set isakmp-profile vpn1-ra
  reverse-route
!
crypto dynamic-map vpn2 1
  set transform-set vpn2
  set isakmp-profile vpn2-ra
  reverse-route
!
!
crypto map ra 1 ipsec-isakmp dynamic vpn1
crypto map ra 2 ipsec-isakmp dynamic vpn2

```

The following is sample output from the **show crypto ipsec sa peer platform** command for the IPv4 address 10.1.1.1.

```

Device# show crypto ipsec sa peer 10.1.1.1 platform

----- FLOW ID's:-----

In crypto ipsec sa peer platform

Freeing the elements in context

```

The following sample output shows the status of HA-enabled IPsec SAs that are in the active state:

```
Device# show crypto ipsec sa active

interface: Ethernet0/0
  Crypto map tag: to-peer-outside, local addr 10.165.201.3
  protected vrf: (none)
  local ident (addr/mask/prot/port): (192.168.0.1/255.255.255.255/0/0)
  remote ident (addr/mask/prot/port): (172.16.0.1/255.255.255.255/0/0)
  Group: GET-SGT
  current_peer 192.168.200.225 port 500
    PERMIT, flags={origin_is_acl,}
    #pkts encaps: 3, #pkts encrypt: 3, #pkts digest: 3
    #pkts decaps: 4, #pkts decrypt: 4, #pkts verify: 4
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #send errors 0, #recv errors 0
    local crypto endpt.: 192.168.201.3, remote crypto endpt.: 192.168.200.225
    path mtu 1500, media mtu 1500
    current outbound spi: 0xD42904F0(3559458032)
    inbound esp sas:
      spi: 0xD3E9ABD0(3555306448)
        transform: esp-3des ,
        in use settings =(Tunnel, )
        conn id: 2006, flow_id: 6, crypto map: to-peer-outside
        sa timing: remaining key lifetime (k/sec): (4586265/3542)
          HA last key lifetime sent(k): (4586267)
        ike_cookies: 9263635C CA4B4E99 C14E908E 8EE2D79C
        IV size: 8 bytes
        replay detection support: Y
        Status: ACTIVE
```

The following sample output shows the IPsec SA status of only the standby device. The fields in the display are either self-explanatory or can be found in the preceding tables.

```
Device# show crypto ipsec sa standby

interface: Ethernet0/0
  Crypto map tag: to-peer-outside, local addr 10.165.201.3
  protected vrf: (none)
  local ident (addr/mask/prot/port): (192.168.0.1/255.255.255.255/0/0)
  remote ident (addr/mask/prot/port): (172.16.0.1/255.255.255.255/0/0)
  Group: GET-SGT
  current_peer 192.168.200.225 port 500
    PERMIT, flags={origin_is_acl,}
    #pkts encaps: 0, #pkts encrypt: 0, #pkts digest: 0
    #pkts decaps: 0, #pkts decrypt: 0, #pkts verify: 0
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #send errors 0, #recv errors 0
    local crypto endpt.: 192.168.201.3, remote crypto endpt.: 192.168.200.225
    path mtu 1500, media mtu 1500
    current outbound spi: 0xD42904F0(3559458032)
    inbound esp sas:
      spi: 0xD3E9ABD0(3555306448)
        transform: esp-3des ,
        in use settings =(Tunnel, )
        conn id: 2012, flow_id: 12, crypto map: to-peer-outside
        sa timing: remaining key lifetime (k/sec): (4441561/3486)
```

```

        HA last key lifetime sent(k): (4441561)
    ike_cookies: 00000000 00000000 00000000 00000000
    IV size: 8 bytes
    replay detection support: Y
    Status: STANDBY
inbound ah sas:
    spi: 0xF3EE3620(4092474912)
    transform: ah-md5-hmac ,
    in use settings ={Tunnel, }
    conn id: 2012, flow_id: 12, crypto map: to-peer-outside
    sa timing: remaining key lifetime (k/sec): (4441561/3486)
        HA last key lifetime sent(k): (4441561)
    ike_cookies: 00000000 00000000 00000000 00000000
    replay detection support: Y
    Status: STANDBY
inbound pcp sas:
outbound esp sas:
    spi: 0xD42904F0(3559458032)
    transform: esp-3des ,
    in use settings ={Tunnel, }
    conn id: 2011, flow_id: 11, crypto map: to-peer-outside
    sa timing: remaining key lifetime (k/sec): (4441561/3485)
        HA last key lifetime sent(k): (4441561)
    ike_cookies: 00000000 00000000 00000000 00000000
    IV size: 8 bytes
    replay detection support: Y
    Status: STANDBY
outbound ah sas:
    spi: 0x75251086(1965363334)
    transform: ah-md5-hmac ,
    in use settings ={Tunnel, }
    conn id: 2011, flow_id: 11, crypto map: to-peer-outside
    sa timing: remaining key lifetime (k/sec): (4441561/3485)
        HA last key lifetime sent(k): (4441561)
    ike_cookies: 00000000 00000000 00000000 00000000
    replay detection support: Y
    Status: STANDBY
outbound pcp sas:

```

The following table describes the significant fields shown in the displays.

Table 24: show crypto ipsec sa Field Descriptions

| Field | Description |
|------------------------------------|---|
| interface | Interface on which the SA is created. |
| Crypto map tag | Policy tag for IPsec. |
| protected vrf | IVRF name that applies to the IPsec interface. |
| local ident (addr/mask/prot/port) | Local selector that is used for encryption and decryption. |
| remote ident (addr/mask/prot/port) | Remote selector that is used for encryption and decryption. |
| Group | Name of the GDOI group corresponding to the IPsec SA. |
| current peer | Peer that communicates with the IPsec tunnel. |

| Field | Description |
|------------------------|---|
| PERMIT, flags | Indicates that the IPsec SA is triggered by the access control list (ACL) permit action. |
| pkts encaps | Number of packets that were successfully encapsulated by IPsec. |
| pkts encrypt | Number of packets that were successfully encrypted by IPsec. |
| pkts digest | Number of packets that were successfully hash digested by IPsec. |
| pkts decaps | Number of packets that were successfully decapsulated by IPsec. |
| pkts decrypt | Number of packets that were successfully decrypted by IPsec. |
| pkts verify | Number of received packets that passed the hash digest check. |
| pkts compressed | Number of packets that were successfully compressed by IPsec. |
| pkts decompressed | Number of packets that were successfully decompressed by IPsec. |
| pkts not compressed | Number of outbound packets that were not compressed. |
| pkts compr. failed | Number of packets that failed compression by IPsec. |
| pkts not decompressed | Number of inbound packets that were not compressed. |
| pkts decompress failed | Number of packets that failed decompression by IPsec. |
| send errors | Number of outbound packets with errors. |
| recv errors | Number of inbound packets with errors. |
| local crypto endpt. | Local endpoint terminated by IPsec. |
| remote crypto endpt. | Remote endpoint terminated by IPsec. |
| path mtu | MTU size that is calculated based on the Internet Control Message Protocol (ICMP) unreachable packet, including the IPsec overhead, if any. |
| media mtu | MTU value for media, such as an Ethernet interface or a serial interface. |
| ip mtu | Interface MTU size that is dependent on the IPsec overhead. |
| ip mtu idb | Interface description block (IDB) that is used to determine the crypto IP MTU. |
| current outbound spi | Current outbound Security Parameters Index (SPI). |
| current outbound spi | Current outbound Security Parameter Index (SPI). |
| inbound esp sas | Encapsulating Security Payload (ESP) for the SA for the inbound traffic. |

| Field | Description |
|---|---|
| spi | SPI for classifying the inbound packet. |
| transform | Security algorithm that is used to provide authentication, integrity, and confidentiality. |
| in use settings | Transform that the SA uses (such as tunnel mode, transport mode, UDP-encapsulated tunnel mode, or UDP-encapsulated transport mode). |
| conn id | ID that is stored in the crypto engine to identify the IPsec/Internet Key Exchange (IKE) SA. |
| flow_id | SA identity. |
| crypto map | Policy for IPsec. |
| sa timing: remaining key lifetime (k/sec) | Seconds or kilobytes remaining before a rekey occurs. |
| HA last key lifetime sent (k) | Last stored kilobytes lifetime value for HA. |
| ike_cookies | ID that identifies the IKE SAs. |
| IV size | Size of the initialization vector (IV) that is used for the cryptographic synchronization data used to encrypt the payload. |
| replay detection support | Replay detection feature enabled by a specific SA. |
| Status | Indicates whether the SA is active. |
| inbound ah sas | Authentication algorithm for the SA for inbound traffic. |
| inbound pcp sas | Compression algorithm for the SA for inbound traffic. |
| outbound esp sas | Encapsulating security payload for the SA for outbound traffic. |
| outbound ah sas | Authentication algorithm for the SA for outbound traffic. |
| outbound pcp sas | Compression algorithm for the SA for outbound traffic. |
| DENY, flags | Indicates that the IPsec SA is triggered by the ACL deny action. |
| pkts decompress failed | Packets decompressed by IPsec that failed. |
| pkts no sa (send) | Outbound packets that could not find the associated IPsec SA. |
| pkts invalid sa (rcv) | Received packets that failed the IPsec format check. |
| pkts invalid prot (rcv) | Received packets that have the wrong protocol field. |
| pkts verify failed | Received packets that failed the hash digest check. |
| pkts invalid identity (rcv) | Packets that could not find the associated selector after decryption. |

| Field | Description |
|-----------------------------|---|
| pkts invalid len (rcv) | Inbound packets that have an incorrect pad length for the software crypto engine. |
| pkts replay rollover (send) | Sent packets that failed the replay test check. |
| pkts replay rollover (rcv) | Received packets that failed the replay test check. |
| pkts internal err (send) | Sent packets that failed because of a software or hardware error. |
| pkts internal err (rcv) | Received packets that failed because of a software or hardware error. |
| protected vrf | IVRF name that applies to the IPsec interface. |
| pkts tagged (send) | Packets tagged with a Cisco TrustSec SGT in the outbound direction. |
| pkts untagged (rcv) | Packets not tagged with a Cisco TrustSec SGT in the inbound direction. |

Related Commands

| Command | Description |
|--|---|
| crypto ipsec security-association | Configures IPsec security associations. |

show crypto ipsec security-association idle-time

To display the security association (SA) idle-time value configured for crypto map entry, use the **show crypto ipsec security-association idle-time** command in privileged EXEC mode.

show crypto ipsec security-association idle-time

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|------------------|--|
| 12.2(33)SRB | This command was introduced in a release earlier than Cisco IOS Release 12.2(33)SRB. |
| 12.2SX | This command was integrated into Cisco IOS Release 12.2SX. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |
| Cisco IOS XE 2.3 | This command was integrated into Cisco IOS XE Release 2.3. |

Usage Guidelines

Use the **show crypto ipsec security-association idle-time** command to display the idle time.

When a router running the Cisco IOS software creates an IPsec SA for a peer, resources must be allocated to maintain the SA. The SA requires both memory and several managed timers. For idle peers, these resources are wasted. If enough resources are wasted by idle peers, the router could be prevented from creating new SAs with other peers. The IPsec Security Association Idle Timers feature introduces a configurable idle timer to monitor SAs for activity, allowing SAs for idle peers to be deleted. This increases the availability of the resources and improve scalability of Cisco IOS IPsec deployments.

Examples

The following is a sample output from the **show crypto ipsec security-association idle-time** command. The output is self-explanatory.

```
Router# show crypto ipsec security-association idle-time
Security association idletime: 567 seconds
```

Related Commands

| Command | Description |
|---|--|
| show crypto ipsec security-association lifetime | Displays the SA lifetime value configured for a particular crypto map entry. |

show crypto ipsec security-association lifetime

To display the security association (SA) lifetime value configured for a particular crypto map entry, use the **show crypto ipsec security-association lifetime** command in EXEC mode.

show crypto ipsec security-association lifetime

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

| Release | Modification |
|-------------|---|
| 11.3 T | This command was introduced.\ |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Examples

The following is sample output for the **show crypto ipsec security-association lifetime** command:

```
Router# show crypto ipsec security-association lifetime
Security-association lifetime: 4608000 kilobytes/120 seconds
```

The following configuration was in effect when the previous **show crypto ipsec security-association lifetime** command was issued:

```
crypto ipsec security-association lifetime seconds 120
```

show crypto ipsec transform-set

To display the configured transform sets or active default transform sets, use the **show crypto ipsec transform-set** command in privileged EXEC mode.

```
show crypto ipsec transform-set [tag transform-set-name]
```

| Syntax Description | tag transform-set-name | (Optional) Only the specified transform sets are displayed. |
|--------------------|------------------------|---|
|--------------------|------------------------|---|

Command Modes
Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|--------------------------|---|
| | 11.3 T | This command was introduced. |
| | 12.2(13)T | The command output was expanded to include a warning message for users who try to configure an IP Security (IPsec) transform that the hardware does not support. |
| | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| | 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| | 12.4(20)T | The command output was expanded to include information about active default transform sets. |
| | Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines There are two default transform sets supported in Cisco IOS k9 images only:

- Esp-aes esp-sha-hmac
- Esp-3des esp-sha-hmac

The **show crypto ipsec transform-set** command will display the default transform sets if there are no other transform set configured, you have not disabled the default transform sets by issuing the **no crypto ipsec default transform-set** command, and the crypto engine supports the encryption algorithm.

Examples

The following is sample output for the **show crypto ipsec transform-set** command when the default transform sets have been disabled with the **no crypto ipsec default transform-set** command:

```
Router# show crypto ipsec transform-set
Transform set combined-des-sha: {esp-des esp-sha-hmac}
    will negotiate = { Tunnel, },

Transform set combined-des-md5: {esp-des esp-md5-hmac}
    will negotiate = { Tunnel, },
```

```

Transform set t1: {esp-des esp-md5-hmac}
  will negotiate = {Tunnel,},

Transform set t100: {ah-sha-hmac}
  will negotiate = {Transport,},

Transform set t2: {ah-sha-hmac}
  will negotiate = {Tunnel,},
  { esp-des }
  will negotiate = {Tunnel,},

```

The following configuration was in effect when the previous **show crypto ipsec transform-set** command was issued:

```

crypto ipsec transform-set combined-des-sha esp-des esp-sha-hmac
crypto ipsec transform-set combined-des-md5 esp-des esp-md5-hmac
crypto ipsec transform-set t1 esp-des esp-md5-hmac
crypto ipsec transform-set t100 ah-sha-hmac
  mode transport
crypto ipsec transform-set t2 ah-sha-hmac esp-des
no crypto ipsec default transform-set

```

The following sample output from the **show crypto ipsec transform-set** command displays a warning message after a user tries to configure an IPsec transform that the hardware does not support:

```

Router# show crypto ipsec transform-set
Transform set transform-1:{ esp-256-aes esp-md5-hmac }
  will negotiate = { Tunnel, },
WARNING: encryption hardware does not support transform esp-aes 256 within IPsec transform
transform-1

```

The following is sample output for the **show crypto ipsec transform-set** command when the default transform sets are active and the crypto engine supports the encryption algorithm:

```

Router# show crypto ipsec transform-set
Transform set asset: { esp-256-aes esp-sha-hmac }
  will negotiate = { Transport, },

Transform set aasset: { esp-256-aes esp-sha-hmac }
  will negotiate = { Transport, },

Transform set #${default_transform_set_1}: { esp-aes esp-sha-hmac }
  will negotiate = { Transport, },

Transform set #${default_transform_set_0}: { esp-3des esp-sha-hmac }
  will negotiate = { Transport, },

```

Related Commands

| Command | Description |
|--|--|
| show crypto ipsec default transform-set | Displays the default IPsec transform sets. |
| show crypto ipsec transform-set | Displays the configured transform sets. |
| show crypto map (IPsec) | Displays the crypto map configuration. |

show crypto isakmp default policy

To display the default Internet Key Exchange (IKE) policies currently in use, use the **show crypto isakmp default policy** command in privileged EXEC mode.

show crypto isakmp default policy

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines

If you have neither manually configured IKE policies with the **crypto isakmp policy** command nor issued the **no crypto isakmp default policy** command, IPsec will use the default IKE policies to negotiate IKE proposals. There are eight default IKE default policies supported (see the table below). The default IKE policies define the following policy set parameters:

- The priority, 65507-65514, where 65507 is the highest priority and 65514 is the lowest priority.
- The authentication method, Rivest, Shamir, and Adelman (RSA) or preshared keys (PSK).
- The encryption method, Advanced Encryption Standard (AES) or Triple Data Encryption Standard (3DES).
- The hash function, Secure Hash Algorithm (SHA-1) or Message-Digest algorithm 5 (MD5).
- The Diffie-Hellman (DH) group specification DH2 or DH5.
 - DH2 specifies the 768-bit Diffie-Hellman group.
 - DH5 specifies the 1536-bit Diffie-Hellman group.

Table 25: Default IKE Policies

| Priority | Authentication | Encryption | Hash | Diffie-Hellman |
|----------|----------------|------------|------|----------------|
| 65507 | RSA | AES | SHA | DH5 |
| 65508 | PSK | AES | SHA | DH5 |
| 65509 | RSA | AES | MD5 | DH5 |
| 65510 | PSK | AES | MD5 | DH5 |
| 65511 | RSA | 3DES | SHA | DH2 |
| 65512 | PSK | 3DES | SHA | DH2 |

| Priority | Authentication | Encryption | Hash | Diffie-Hellman |
|----------|----------------|------------|------|----------------|
| 65513 | RSA | 3DES | MD5 | DH2 |
| 65514 | PSK | 3DES | MD5 | DH2 |

If you have manually configured IKE policies and you issue the **show crypto isakmp default policy** command there is no output, since the default IKE policies are not in use.

Examples

The following example displays the eight default policies with protection suites of priorities 65507-65014. The default policies are displayed since there are no user configured policies, the default policies have not been disabled, and EzVPN is not configured.

```
Router# show crypto isakmp default policy
Default protection suite of priority 65507
  encryption algorithm: AES - Advanced Encryption Standard (128 bit keys).
  hash algorithm:      Secure Hash Standard
  authentication method: Rivest-Shamir-Adleman Signature
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65508
  encryption algorithm: AES - Advanced Encryption Standard (128 bit keys).
  hash algorithm:      Secure Hash Standard
  authentication method: Pre-Shared Key
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65509
  encryption algorithm: AES - Advanced Encryption Standard (128 bit keys).
  hash algorithm:      Message Digest 5
  authentication method: Rivest-Shamir-Adleman signature
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65510
  encryption algorithm: AES - Advanced Encryption Standard (128 bit keys).
  hash algorithm:      Message Digest 5
  authentication method: pre-shared key
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65511
  encryption algorithm: Three key triple DES
  hash algorithm:      Secure Hash Standard
  authentication method: Rivest-Shamir-Adleman Signature
  Diffie-Hellman group: #2 (1024 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65512
  encryption algorithm: Three key triple DES
  hash algorithm:      Secure Hash Standard
  authentication method: Pre-Shared Key
  Diffie-Hellman group: #2 (1024 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65513
  encryption algorithm: Three key triple DES
  hash algorithm:      Message Digest 5
  authentication method: Rivest-Shamir-Adleman Signature
  Diffie-Hellman group: #2 (1024 bit)
  lifetime:           86400 seconds, no volume limit
Default protection suite of priority 65514
  encryption algorithm: Three key triple DES
  hash algorithm:      Message Digest 5
  authentication method: Pre-Shared Key
```

```
Diffie-Hellman group:  #2 (1024 bit)
lifetime:              86400 seconds, no volume limit
```

The following example shows that there is no output from the **show crypto isakmp default policy** command when the default policies have been disabled.

```
Router(config)# no crypto isakmp default policy
! The default IKE policies have been disabled.
Router(config)# exit
Router# configure terminal
Router# show crypto isakmp default policy
Router#
! There is no output from the show crypto isakmp default policy command.
```

Related Commands

| Command | Description |
|--|--|
| crypto isakmp policy | Defines an IKE policy. |
| no crypto isakmp default policy | Disables IKE default policies. |
| show crypto isakmp policy | Displays the parameters for each IKE policy. |

show crypto isakmp diagnose error

To display Internet Key Exchange (IKE) error diagnostics, use the **show crypto isakmp diagnose error** command in global configuration mode.

show crypto isakmp diagnose error [{count}]

Syntax Description

| | |
|--------------|-------------------------------------|
| count | (Optional) Displays error counters. |
|--------------|-------------------------------------|

Command Default

IKE error diagnostics is enabled by default.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|----------|------------------------------|
| 15.3(2)T | This command was introduced. |

Usage Guidelines

IKE is a key management protocol standard that is used in conjunction with the IPsec to configure basic IPsec VPNs. IPsec can be configured without IKE, but IKE enhances IPsec by providing additional features, flexibility, and ease of configuration for the IPsec standard. IKE is a hybrid protocol that implements the Oakley key exchange and Skeme key exchange inside the Internet Security Association and Key Management Protocol (ISAKMP) framework.

Use this command to display IKE error-path tracing and to specify the number of entries in the exit path database. When the entries exceed the specified number, new entries replace the old entries.

Examples

The following is sample output from the **show crypto isakmp diagnose error count** command. The fields in this output are self-explanatory.

```
Device# show crypto isakmp diagnose error count
Exit Trace counters
32 - Failed to access account record.
32 - Failed to send delete, peer isn't authenticated.
31 - SA is still negotiating. Attached new ipsec request to it.
8 - Failed to delete policy.
```


show crypto isakmp key

To list the keyrings and their preshared keys, use the **show crypto isakmp key** command in privileged EXEC mode.

show crypto isakmp key

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|--------------------------|---|
| 12.2(15)T | This command was introduced. |
| 12.4(4)T | IPv6 address information was added to command output. |
| Cisco IOS XE Release 2.1 | This command was introduced on Cisco ASR 1000 Series Routers. |

Examples

The following is sample output for the **show crypto isakmp key** command:

```
Router# show crypto isakmp key
Hostname/Address      Preshared Key
vpn1                  : 172.61.1.1      vpn1
vpn2                  : 10.1.1.1        vpn2
```

The following configuration was in effect when the above **show crypto isakmp key** command was issued:

```
crypto keyring vpn1
  pre-shared-key address 172.16.1.1 key vpn1
crypto keyring vpn2
  pre-shared-key address 10.1.1.1 key vpn2
```

The table below describes significant fields in the **show crypto isakmp key** profile.

Table 26: show crypto isakmp key Field Descriptions

| Field | Description |
|------------------|--|
| Hostname/Address | The preshared key host name or address. |
| Preshared Key | The preshared key. |
| keyring | Name of the crypto keyring. The global keys are listed in the default keyring. |
| VRF string | The Virtual Private Network routing and forwarding (VRF) of the keyring. If the keyring does not have a VRF, an empty string is printed. |

show crypto isakmp peers

To display the Internet Security Association and Key Management Protocol (ISAKMP) peer descriptions, use the **show crypto isakmp peers** command in privileged EXEC mode.

show crypto isakmp peers [{*ipaddress*|*ipv6address* | **config** [*peername*]}]

| Syntax Description | |
|--------------------|---|
| <i>ipaddress</i> | (Optional) The IP address of the specific peer. Note If the optional <i>ipaddress</i> argument is not included with the command, a summarization of all peers is displayed. |
| <i>ipv6address</i> | (Optional) The IPv6 address of the specific peer. |
| config | (Optional) Displays detailed information about all peers or a specific peer. |
| <i>peername</i> | (Optional) The peer name. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.3(4)T | This command was introduced. |
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 12.4(4)T | The config keyword was added. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.4(11)T | The show crypto isakmp peer command name was changed to show crypto isakmp peers . |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 on the Cisco ASR 1000 Series Routers. |

Usage Guidelines

Before you can use the **config** keyword, the following commands must be enabled for the accounting update to work correctly: **aaa accounting update** with **new info** keyword and **radius-server vsa send** with **accounting** keyword.

Examples

The following output example shows information about the peer named "This-is-another-peer-at-10-1-1-3":

```
Router# show crypto isakmp peers
Peer: 10.1.1.3 Port: 500
  Description: This-is-another-peer-at-10-1-1-3
  Phase1 id: 10.1.1.3
```

In the following example, the **config** keyword is used to display all manageability information for an Easy VPN remote device. Cisco Easy VPN is an IP Security (IPsec) virtual private network (VPN) solution supported by Cisco routers and security appliances. It greatly simplifies VPN deployment for remote offices and mobile workers. The fields are self-explanatory.

```
Router# show crypto isakmp peers config
Client-Public-Addr=192.168.10.2:500; Client-Assigned-Addr=172.16.1.209; Client-Group=branch;
  Client-User=branch; Client-Hostname=branch.; Client-Platform=Cisco 1711;
Client-Serial=FOC080210E2 (412454448); Client-Config-Version=11; Client-Flash=33292284;
Client-Available-Flash=10202680; Client-Memory=95969280; Client-Free-Memory=14992140;
Client-Image=flash:c1700-advipservicesk9-mz.ef90241;
Client-Public-Addr=192.168.10.3:500; Client-Assigned-Addr=172.16.1.121; Client-Group=store;
  Client-User=store; Client-Hostname=831-storerouter.; Client-Platform=Cisco C831;
Client-Serial=FOC08472UXR (1908379618); Client-Config-Version=2; Client-Flash=24903676;
Client-Available-Flash=5875028; Client-Memory=45298688; Client-Free-Memory=6295596;
Client-Image=flash:c831-k9o3y6-mz.ef90241
```

Related Commands

| Command | Description |
|-------------------------------|--|
| aaa accounting update | Enables the periodic interim accounting records to be sent to the accounting server. |
| radius-server vsa send | Configures the network access server (NAS) to recognize and use vendor-specific attributes (VSAs). |
| clear crypto session | Deletes crypto sessions (IPSec and IKE) SAs. |
| show crypto session | Displays status information for active crypto sessions in a router. |

show crypto isakmp policy

To display the parameters for each Internet Key Exchange (IKE) policy, use the **show crypto isakmp policy** command in privileged EXEC mode.

show crypto isakmp policy

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|---|
| 11.3T | This command was introduced. |
| 12.2(13)T | The command output was expanded to include a warning message for users who try to configure an IKE encryption method that the hardware does not support. |
| 12.4(4)T | Support for IPv6 was added. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T | The command output was expanded to include default IKE policies. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines

There are eight default IKE default policies supported with protection suites of priorities 65507-65514, where 65507 is the highest priority and 65514 is the lowest priority. If you have neither manually configured IKE policies with the **crypto isakmp policy** command nor disabled the default IKE policies by issuing the **no crypto isakmp default policy** command, the default IKE policies will be displayed when the **show crypto isakmp policy** command is issued.

Examples

The following is sample output from the **show crypto isakmp policy** command, after two IKE policies have been configured (with priorities 15 and 20, respectively):

```
Router# show crypto isakmp policy
Protection suite priority 15
  encryption algorithm:    DES - Data Encryption Standard (56 bit keys)
  hash algorithm:         Message Digest 5
  authentication method:   Rivest-Shamir-Adleman Signature
  Diffie-Hellman Group:    #2 (1024 bit)
  lifetime:                5000 seconds, no volume limit
Protection suite priority 20
  encryption algorithm:    DES - Data Encryption Standard (56 bit keys)
  hash algorithm:         Secure Hash Standard
  authentication method:   preshared Key
  Diffie-Hellman Group:    #1 (768 bit)
```

```

lifetime:      10000 seconds, no volume limit
Default protection suite
encryption algorithm:  DES - Data Encryption Standard (56 bit keys)
hash algorithm:  Secure Hash Standard
authentication method:  Rivest-Shamir-Adleman Signature
Diffie-Hellman Group:  #1 (768 bit)
lifetime:      86400 seconds, no volume limit

```



Note Although the output shows "no volume limit" for the lifetimes, you can currently configure only a time lifetime (such as 86,400 seconds); volume limit lifetimes are not used.

The following sample output from the **show crypto isakmp policy** command displays a warning message after a user tries to configure an IKE encryption method that the hardware does not support:

```

Router# show crypto isakmp policy
Protection suite of priority 1
  encryption algorithm:  AES - Advanced Encryption Standard (256 bit keys).
WARNING:encryption hardware does not support the configured
encryption method for ISAKMP policy 1
  hash algorithm:      Secure Hash Standard
  authentication method: Pre-Shared Key
  Diffie-Hellman group: #1 (768 bit)
  lifetime:           3600 seconds, no volume limit

```

The following sample output from the **show crypto isakmp policy** command displays the default IKE policies. The manually configured IKE policies with priorities 10 and 20 have been removed.

```

Router(config)# no crypto isakmp policy 10
Router(config)# no crypto isakmp policy 20
Router(config)# exit
R1# show crypto isakmp policy
Default IKE policy
Protection suite of priority 65507
  encryption algorithm:  AES - Advanced Encryption Standard (128 bit key.
  hash algorithm:      Secure Hash Standard
  authentication method: Rivest-Shamir-Adleman Signature
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Protection suite of priority 65508
  encryption algorithm:  AES - Advanced Encryption Standard (128 bit key.
  hash algorithm:      Secure Hash Standard
  authentication method: Pre-Shared Key
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Protection suite of priority 65509
  encryption algorithm:  AES - Advanced Encryption Standard (128 bit key.
  hash algorithm:      Message Digest 5
  authentication method: Rivest-Shamir-Adleman Signature
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Protection suite of priority 65510
  encryption algorithm:  AES - Advanced Encryption Standard (128 bit key.
  hash algorithm:      Message Digest 5
  authentication method: Pre-Shared Key
  Diffie-Hellman group: #5 (1536 bit)
  lifetime:           86400 seconds, no volume limit
Protection suite of priority 65511
  encryption algorithm:  Three key triple DES
  hash algorithm:      Secure Hash Standard

```

```

authentication method: Rivest-Shamir-Adleman Signature
Diffie-Hellman group: #2 (1024 bit)
lifetime: 86400 seconds, no volume limit
Protection suite of priority 65512
encryption algorithm: Three key triple DES
hash algorithm: Secure Hash Standard
authentication method: Pre-Shared Key
Diffie-Hellman group: #2 (1024 bit)
lifetime: 86400 seconds, no volume limit
Protection suite of priority 65513
encryption algorithm: Three key triple DES
hash algorithm: Message Digest 5
authentication method: Rivest-Shamir-Adleman Signature
Diffie-Hellman group: #2 (1024 bit)
lifetime: 86400 seconds, no volume limit
Protection suite of priority 65514
encryption algorithm: Three key triple DES
hash algorithm: Message Digest 5
authentication method: Pre-Shared Key
Diffie-Hellman group: #2 (1024 bit)
lifetime: 86400 seconds, no volume limit

```

The field descriptions in the display are self-explanatory.

Related Commands

| Command | Description |
|--|---|
| authentication (IKE policy) | Specifies the authentication method within an IKE policy. |
| crypto isakmp policy | Defines an IKE policy. |
| encryption (IKE policy) | Specifies the encryption algorithm within an IKE policy. |
| group (IKE policy) | Specifies the DH group identifier within an IKE policy. |
| hash (IKE policy) | Specifies the hash algorithm within an IKE policy. |
| lifetime (IKE policy) | Specifies the lifetime of an IKE SA. |
| show crypto isakmp default policy | Displays the default IKE policies. |

show crypto isakmp profile

To list all the Internet Security Association and Key Management Protocol (ISAKMP) profiles that are defined on a router, use the **show crypto isakmp profile** command in privileged EXEC mode.

show crypto isakmp profile [{tag *profilename* | vrf *vrfname*}]

| Syntax Description | tag <i>profilename</i> | (Optional) Displays ISAKMP profile details specified by the profile name. |
|--------------------|------------------------|---|
| | vrf <i>vrfname</i> | (Optional) Displays ISAKMP profile details specified by the VPN routing/forwarding instance (VRF) name. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.2(15)T | This command was introduced. |
| 12.4(4)T | IPv6 support was added. |
| 12.4(11)T | The tag <i>profilename</i> and vrf <i>vrfname</i> keywords and arguments were added. |
| Cisco IOS XE Release 2.1 | This command was introduced on Cisco ASR 1000 Series Routers. |

Examples

The following is sample output from the **show crypto isakmp profile** command:

```
Router# show crypto isakmp profile
ISAKMP PROFILE vpn1-ra
  Identities matched are:
group vpn1-ra
  Identity presented is: ip-address
```

The following sample output shows information for an IPv6 router:

```
Router# show crypto isakmp profile
ISAKMP PROFILE tom
Identities matched are:
ipv6-address 2001:0DB8:0:1::1/32
Certificate maps matched are:
Identity presented is: ipv6-address fqdn
keyring(s): <none>
trustpoint(s): <all>
```

The table below describes the significant fields shown in the display.

Table 27: show crypto isakmp profile Field Descriptions

| Field | Description |
|----------------|-----------------------------|
| ISAKMP PROFILE | Name of the ISAKMP profile. |

| Field | Description |
|-------------------------|---|
| Identities matched are: | Lists all identities that the ISAKMP profile will match. |
| Identity presented is: | The identity that the ISAKMP profile will present to the remote endpoint. |

The following configuration was in effect when the preceding **show crypto isakmp profile** command was issued:

```
crypto isakmp profile vpn1-ra
vrf vpn1
self-identity address
match identity group vpn1-ra
client authentication list aaa-list
isakmp authorization list aaa
client configuration address initiate
client configuration address respond
```

Related Commands

| Command | Description |
|-------------------------------|--|
| show crypto isakmp key | Lists the keyrings and their preshared keys. |

show crypto isakmp sa

To display current Internet Key Exchange (IKE) security associations (SAs), use the **show crypto isakmp sa** command in privileged EXEC mode.

show crypto isakmp sa [{**active** | **standby** | **detail** | **nat**}] [**vrf** *vrfname*]

| Syntax Description | | |
|--------------------|--|--|
| active | (Optional) Displays high availability- (HA-) enabled Internet Security Association and Key Management Protocol (ISAKMP) SAs that are in the active state. | |
| standby | (Optional) Displays HA-enabled ISAKMP SAs that are in the standby state. | |
| detail | (Optional) Displays all existing IKE SAs, whether in an active or standby state. | |
| nat | (Optional) Displays IKE SAs that have undergone network address translation (NAT). | |
| vrf <i>vrfname</i> | (Optional) Displays IKE SA details about the specified VRF. <ul style="list-style-type: none"> The <i>vrfname</i> value is the name of the VRF. | |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 11.3 T | This command was introduced. |
| 12.3(11)T | The active and standby keywords were added. |
| 12.4(4)T | IPv6 information was added to the command output. The detail and nat keywords were added. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.4(11)T | The vrf <i>vrfname</i> keyword and argument were added. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 15.4(2)S | This command was implemented on the Cisco ASR 901 Series Aggregation Services Router. |

Usage Guidelines

If neither the **active** keyword nor the **standby** keyword is specified, current SAs for all configured routers will be shown. Use the **nat** keyword to display the IP address and port address of a remote peer when NAT is used.

Examples

The following sample output shows the SAs of both the active and standby devices:

```
Router# show crypto isakmp sa
dst          src          state          conn-id slot status
10.165.201.3 10.165.200.225 QM_IDLE        2      0 STDBY
10.0.0.1     10.0.0.2     QM_IDLE        1      0 ACTIVE
```

The following sample output shows the SAs of only the active device:

```
Router# show crypto isakmp sa active
dst          src          state          conn-id slot status
10.165.201.3 10.165.200.225 QM_IDLE          5     0 ACTIVE
```

The following sample output shows the SAs of only the standby device:

```
Router# show crypto isakmp sa standby
dst          src          state          conn-id slot status
10.165.201.3 10.165.200.225 QM_IDLE          5     0 STDBY
10.165.201.3 10.165.200.225 QM_IDLE          1     0 STDBY
```

The following sample output shows the SAs of an active IPv6 device. The IPv4 device is inactive.

```
Router# show crypto isakmp sa detail
Codes: C - IKE configuration mode, D - Dead Peer Detection
       K - Keepalives, N - NAT-traversal
       X - IKE Extended Authentication
       psk - Preshared key, rsig - RSA signature
       renc - RSA encryption

IPv4 Crypto ISAKMP SA
C-id Local Remote I-VRF Status Encr Hash Auth DH
Lifetime Cap.
IPv6 Crypto ISAKMP SA
dst: 3FFE:2002::A8BB:CCFF:FE01:2C02
src: 3FFE:2002::A8BB:CCFF:FE01:9002
conn-id: 1001 I-VRF: Status: ACTIVE Encr: des Hash: sha Auth:
psk
DH: 1 Lifetime: 23:45:00 Cap: D Engine-id:Conn-id = SW:1
dst: 3FFE:2002::A8BB:CCFF:FE01:2C02
src: 3FFE:2002::A8BB:CCFF:FE01:9002
conn-id: 1002 I-VRF: Status: ACTIVE Encr: des Hash: sha Auth:
psk
DH: 1 Lifetime: 23:45:01 Cap: D Engine-id:Conn-id = SW:2
```

The first three tables below show the various states that may be displayed in the output of the **show crypto isakmp sa** command. When an Internet Security Association and Key Management Protocol (ISAKMP) SA exists, it will most likely be in its quiescent state (QM_IDLE). For long exchanges, some of the main mode (MM_XXX) states may be observed.

Table 28: States in Main Mode Exchange

| State | Explanation |
|-------------|---|
| MM_NO_STATE | The ISAKMP SA has been created, but nothing else has happened yet. It is "larval" at this stage--there is no state. |
| MM_SA_SETUP | The peers have agreed on parameters for the ISAKMP SA. |
| MM_KEY_EXCH | The peers have exchanged Diffie-Hellman public keys and have generated a shared secret. The ISAKMP SA remains unauthenticated. |
| MM_KEY_AUTH | The ISAKMP SA has been authenticated. If the router initiated this exchange, this state transitions immediately to QM_IDLE, and a Quick Mode exchange begins. |

Table 29: States in Aggressive Mode Exchange

| State | Explanation |
|--------------|---|
| AG_NO_STATE | The ISAKMP SA has been created, but nothing else has happened yet. It is "larval" at this stage--there is no state. |
| AG_INIT_EXCH | The peers have done the first exchange in aggressive mode, but the SA is not authenticated. |
| AG_AUTH | The ISAKMP SA has been authenticated. If the router initiated this exchange, this state transitions immediately to QM_IDLE, and a quick mode exchange begins. |

Table 30: States in Quick Mode Exchange

| State | Explanation |
|---------|--|
| QM_IDLE | The ISAKMP SA is idle. It remains authenticated with its peer and may be used for subsequent quick mode exchanges. It is in a quiescent state. |

Table 31: show crypto isakmp sa Field Descriptions

| Field | Description |
|-------------------------|--|
| f_vrf/i_vrf (not shown) | The front door virtual routing and forwarding (FVRF) and the inside VRF (IVRF) of the IKE SA. If the FVRF is global, the output shows f_vrf as an empty field. |

Related Commands

| Command | Description |
|------------------------------|--------------------------------------|
| crypto isakmp policy | Defines an IKE policy. |
| lifetime (IKE policy) | Specifies the lifetime of an IKE SA. |

show crypto key mypubkey rsa

To display the RSA public keys of your router, use the **show crypto key mypubkey rsa** command in privileged EXEC mode.

show crypto key mypubkey rsa [*keyname*] [*key size*]

Syntax Description

| | |
|-----------------|-----------------------------------|
| <i>keyname</i> | The name of a generated key pair. |
| <i>key size</i> | The key size of the key pair. |

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 11.3T | This command was introduced. |
| 12.3(7)T | The show output was modified to display whether an RSA key is protected (encrypted) and locked or unlocked. |
| 12.2(18)SXE | This command was integrated into Cisco IOS Release 12.2(18)SXE. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.4T | The key size variable was introduced. |
| 15.0(1)M | This command was modified to display whether redundancy is specified in the crypto key generate rsa command. |
| 15.2(2)SA2 | This command was implemented on the Cisco ME 2600X Series Ethernet Access Switches. |

Usage Guidelines

This command displays the RSA public keys of your router.



Note Secure Shell (SSH) may generate an additional RSA keypair if you generate a key pair on a router having no RSA keys. The additional key pair is used only by SSH and will have a name such as `{router.FQDN}.server`. For example, if the name of your router is "router1.cisco.com," the key name would be "router1.cisco.com.server."

Examples

The following is a sample output of the **show crypto key mypubkey rsa** command. Special usage RSA keys were previously generated for this router using the **crypto key generate rsa** command.

```
% Key pair was generated at: 06:07:49 UTC Jan 13 1996
Key name: myrouter.example.com
Key type: RSA KEYS 2048 bits
Usage: Signature Key
Key Data:
005C300D 06092A86 4886F70D 01010105 00034B00 30480241 00C5E23B 55D6AB22
04AEF1BA A54028A6 9ACC01C5 129D99E4 64CAB820 847EDAD9 DF0B4E4C 73A05DD2
BD62A8A9 FA603DD2 E2A8A6F8 98F76E28 D58AD221 B583D7A4 71020301 0001
```

```
% Key pair was generated at: 06:07:50 UTC Jan 13 1996
Key name: myrouter.example.com
Usage: Encryption Key
Key Data:
 00302017 4A7D385B 1234EF29 335FC973 2DD50A37 C4F4B0FD 9DADE748 429618D5
 18242BA3 2EDFBDD3 4296142A DDF7D3D8 08407685 2F2190A0 0B43F1BD 9A8A26DB
 07953829 791FCDE9 A98420F0 6A82045B 90288A26 DBC64468 7789F76E EE21
```

The following example shows how to encrypt the RSA key "pkil-72a.cisco.com." Thereafter, the **show crypto key mypubkey rsa** command is issued to verify that the RSA key is encrypted (protected) and unlocked.

```
Router(config)# crypto key encrypt rsa name pkil-72a.cisco.com passphrase cisco1234
Router(config)# exit
Router# show crypto key mypubkey rsa
```

```
% Key pair was generated at:00:15:32 GMT Jun 25 2003
```

```
Key name:pkil-72a.cisco.com
```

```
Usage:General Purpose Key
```

```
*** The key is protected and UNLOCKED. ***
```

```
Key is not exportable.
```

```
Key Data:
```

```
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00E0CC9A 1D23B52C
CD00910C ABD392AE BA6D0E3F FC47A0EF 8AFEE340 0EC1E62B D40E7DCC
23C4D09E
```

```
03018B98 E0C07B42 3CFD1A32 2A3A13C0 1FF919C5 8DE9565F 1F020301 0001
```

```
% Key pair was generated at:00:15:33 GMT Jun 25 2003
```

```
Key name:pkil-72a.cisco.com.server
```

```
Usage:Encryption Key
```

```
Key is exportable.
```

```
Key Data:
```

```
307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00D3491E 2A21D383
854D7DA8 58AFBDAC 4E11A7DD E6C40AC6 66473A9F 0C845120 7C0C6EC8 1FFF5757
3A41CE04 FDCB40A4 B9C68B4F BC7D624B 470339A3 DE739D3E F7DDB549 91CD4DA4
DF190D26 7033958C 8A61787B D40D28B8 29BCD0ED 4E6275C0 6D020301 0001
```

The following example shows how to lock the key "TP-self-signed-2521856816." Thereafter, the **show crypto key mypubkey rsa** command is issued to verify that the key is protected (encrypted) and locked.

```
Router# crypto key lock rsa name TP-self-signed-2521856816
!
Router# show crypto key mypubkey rsa
% Key pair was generated at: 23:32:48 UTC Feb 16 2021
Key name: TP-self-signed-2521856816
Key type: RSA KEYS 2048 bits
```

```

*** The key is protected and LOCKED. ***
Key is exportable.
Key Data:
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D7808D C5FF14AC
0D2B55AC 5D199F2F 7CB4B355 C555E07B 6D0DECBE 4519B1F0 75B12D6F 902D6E9F
B6FDAD8D 654EF851 5701D5D7 EDA047ED 9A2A619D 5639DF18 EB020301 0001
The string "Redundancy enabled" in the following example indicates that the redundancy
rsa keyword was specified when the key pair "MYKEYS" was generated by the crypto key generate
rsa
command.
Router# show crypto key mypubkey rsa MYKEYS
% Key pair was generated at: 23:32:48 UTC Feb 16 2021
Key name: MYKEYS
Storage Device: not specified
Usage: General Purpose Key
Key is not exportable. Redundancy enabled.
Key Data:
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A63726 28C9EE7D
A89AF6E1 5B42A854 A76EDF9F 35681024 A7868113 B93E2384 EF15CD78 8467A797
F946268F 067FF15E A1734BE6 3E3444C2 BAE00618 BCAED5A3 BB020301 0001

```

Related Commands

| Command | Description |
|--------------------------------|--|
| crypto key encrypt rsa | Encrypts the RSA private key. |
| crypto key generate rsa | Generates RSA key pairs. |
| crypto key lock rsa | Locks the RSA private key in a router. |

show crypto key pubkey-chain rsa

To display the RSA public keys of the peer that are stored on the router, use the **show crypto key pubkey-chain rsa** command in user EXEC mode or p rivileged EXEC mode.

```
show crypto key pubkey-chain rsa [{address key-address | name key-name | vrf vrf-name [address ip-address]}]
```

| Syntax Description | address key-address | (Optional) Address of a specific key to view. |
|--------------------|---------------------|--|
| | name key-name | (Optional) Name of a specific key to view. |
| | vrf vrf-name | (Optional) Name of a specific Virtual Private Network (VPN) Routing and Forwarding (VRF) instance for which to display keys. |
| | address ip-address | (Optional) IP address belonging to a VRF instance. |

Command Default Information is displayed for all RSA public keys stored on the router.

Command Modes
 User EXEC (>)
 Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|--------------------------|---|
| | 11.3T | This command was introduced. |
| | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| | 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| | Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines The keys that are displayed include peers' RSA public keys that are manually configured at the router and keys that are received by the router via other means (such as by a certificate, if certification authority support is configured).

If a router reboots, any keys derived by certificates are lost. This is because the router requests certificates again (then the keys are derived again).

Examples The following example shows how to display information for all RSA public keys stored on the router:

```
Router# show crypto key pubkey-chain rsa
Codes: M - Manually Configured, C - Extracted from certificate
Code Usage      IP-address      Keyring      Name
M      Signature  209.165.200.225  default      myrouter.example.com
M      Encryption  209.165.202.129  default      myrouter.example.com
```

```

C      Signature      209.165.200.225      default      routerA.example.com
C      Encryption    209.165.202.129      default      routerA.example.com
C      General        209.165.200.225      default      routerB.domain1.com

```

The example above shows manually configured special usage RSA public keys for the peer myrouter.example.com. This sample also indicates certificate support and therefore shows three keys obtained from peers' certificates: special usage keys for peer routerA.example.com and a general purpose key for peer routerB.domain1.com.

The following example shows how to display keys for a specific VRF instance.

Router# **show crypto key pubkey-chain rsa vrf**

```

Code Usage      IP-Address/VRF      Keyring      Name
M      General    209.165.200.225      default      Key_1
M      General    209.165.202.129      default      Key_2

```

The following example shows how to display details for a key named somerouter.example.com:

```

Router# show crypto key
pubkey-chain
rsa
name
somerouter.example.com

Key name: somerouter.example.com
Key address: 209.165.200.225
Usage: Signature Key
Source: Manual
Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00C5E23B 55D6AB22
 04AEF1BA A54028A6 9ACC01C5 129D99E4 64CAB820 847EDAD9 DF0B4E4C 73A05DD2
 BD62A8A9 FA603DD2 E2A8A6F8 98F76E28 D58AD221 B583D7A4 71020301 0001
Key name: somerouter.example.com
Key address: 209.165.200.225
Usage: Encryption Key
Source: Manual
Data:
 00302017 4A7D385B 1234EF29 335FC973 2DD50A37 C4F4B0FD 9DADE748 429618D5
 18242BA3 2EDFBDD3 4296142A DDF7D3D8 08407685 2F2190A0 0B43F1BD 9A8A26DB
 07953829 791FCDE9 A98420F0 6A82045B 90288A26 DBC64468 7789F76E EE21

```



Note The Source field in the above example displays "Manual," which means that the keys were manually configured on the router (and not received in the peer's certificate).

The following example shows how to display details for a key with address 209.165.202.129:

```

Router# show crypto key pubkey-chain rsa
address 209.165.202.129
Key name: routerB.example.com
Key address: 209.165.202.129
Usage: General Purpose Key
Source: Certificate
Data:
 0738BC7A 2BC3E9F0 679B00FE 53987BCC 01030201 42DD06AF E228D24C 458AD228
 58BB5DDD F4836401 2A2D7163 219F882E 64CE69D4 B583748A 241BED0F 6E7F2F16
 0DE0986E DF02031F 4B0B0912 F68200C4 C625C389 0BFF3321 A2598935 C1B1

```




Note The Source field in the above example displays "Certificate," which means that the keys were received by the router from the certificate authority.

The table below describes the significant fields shown in the displays.

Table 32: show crypto key pubkey-chain rsa Field Descriptions

| Field | Description |
|----------------|---|
| Code | Source of the key: M (manually configured at the router) or C (received by the router via a certificate). |
| Usage | Purpose of the key: general purpose, signature, or encryption). |
| IP-Address/VRF | IP address or VRF of the key. |
| Keyring | Name of the keyring that stores the key. The possible values are either the name of a user-defined keyring or default (the default keyring). |
| Name | Name of the key. For manually inserted keys (code M), this name is manually configured. For keys that are extracted from the certificate (code C) the name is the subject name in the certificate itself. |
| Data | The contents of the key itself. |

Related Commands

| Command | Description |
|-----------------------------|--|
| crypto key pubkey-chain rsa | Enters public key configuration mode (so you can manually specify other devices' RSA public keys). |
| rsa-pubkey | Defines the RSA manual key to be used for encryption or signature during IKE authentication. |

show crypto map (IPsec)

To display the crypto map configuration, use the **show crypto map** command in user EXEC or privileged EXEC mode.

```
show crypto map [{gdoi fail-close map-name | interface interface | tag map-name}]
```

Syntax Description

| | |
|-----------------------------------|--|
| gdoi | (Optional) Displays information about the status of the Group Domain of Interpretation (GDOI) fail-close mode. |
| fail-close | Specifies the list of crypto maps configured with the fail-close mode. |
| <i>map-name</i> | Name of the specified crypto map. |
| interface <i>interface</i> | (Optional) Displays only the crypto map set that is applied to the specified interface. |
| tag | (Optional) Displays only the crypto map set that is specified. |

Command Default

No crypto maps are displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 11.2 | This command was introduced. |
| 12.3(8)T | This command was integrated into Cisco IOS Release 12.3(8)T. The output was modified to display the crypto input and output Access Control Lists (ACLs) that have been configured. |
| 12.4(4)T | This command was integrated into Cisco IOS Release 12.4(4)T. IPv6 address information was added to command output. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| 12.2SX | This command was integrated into Cisco IOS Release 12.2SX. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. The default transform set information was added to command output. |
| 12.4(22)T | This command was integrated into Cisco IOS Release 12.4(22)T. The gdoi fail-close keywords and the <i>map-tag</i> arguments were added. |
| Cisco IOS XE Release 2.3 | This command was modified. It was integrated into Cisco IOS XE Release 2.3. |

Usage Guidelines

The **show crypto map** command allows you to specify a particular crypto map. The crypto maps shown in the command output are dynamically generated; you need not configure crypto maps in order for them to appear in this command output.

Two default transform sets are supported in Cisco IOS K9 images only:

- Esp-aes esp-sha-hmac
- Esp-3des esp-sha-hmac

The **show crypto map** command displays the default transform sets if no other transform sets are configured for the crypto map, if you have not disabled the default transform sets by issuing the **no crypto ipsec default transform-set** command, and if the crypto engine supports the encryption algorithm.

Examples

The following example shows that crypto input and output ACLs have been configured:

```
Router# show crypto map
Crypto Map "test" 10 ipsec-isakmp
Peer
Extended IP access list ipsec_acl
  access-list ipsec_acl permit ip 192.168.2.0 0.0.0.255 192.168.102.0 0.0.0.255
Extended IP access check IN list 110
  access-list 110 permit ip host 192.168.102.47 192.168.2.0 10.0.0.15
  access-list 110 permit ip host 192.168.102.47 192.168.2.32 10.0.0.15
  access-list 110 permit ip host 192.168.102.47 192.168.2.64 10.0.0.15
  access-list 110 permit ip host 192.168.102.57 192.168.2.0 10.0.0.15
  access-list 110 permit ip host 192.168.102.57 192.168.2.32 10.0.0.15
  access-list 110 permit ip host 192.168.102.57 192.168.2.64 10.0.0.15
Extended IP access check OUT list 120
  access-list 120 permit ip 192.168.2.0 10.0.0.15 host 192.168.102.47
  access-list 120 permit ip 192.168.2.32 10.0.0.15 host 192.168.102.47
  access-list 120 permit ip 192.168.2.64 10.0.0.15 host 192.168.102.47
  access-list 120 permit ip 192.168.2.0 10.0.0.15 host 192.168.102.57
  access-list 120 permit ip 192.168.2.32 10.0.0.15 host 192.168.102.57
  access-list 120 permit ip 192.168.2.64 10.0.0.15 host 192.168.102.57
Current peer: 10.0.0.2
Security association lifetime: 4608000 kilobytes/3600 seconds
PFS (Y/N): N
Transform sets=test
Interfaces using crypto map test:
  Serial0/1
```

The table below describes the significant fields shown in the display.

Table 33: show crypto map Field Descriptions

| Field | Description |
|-------------------------|---|
| Peer | Possible peers that are configured for this crypto map entry. |
| Extended IP access list | Access list that is used to define the data packets that need to be encrypted. Packets that are denied by this access list are forwarded but not encrypted. The "reverse" of this access list is used to check the inbound return packets, which are also encrypted. Packets that are denied by the "reverse" access list are dropped because they should have been encrypted but were not. |

| Field | Description |
|----------------------------------|--|
| Extended IP access check | Access lists that are used to more finely control which data packets are allowed into or out of the IPsec tunnel. Packets that are allowed by the "Extended IP access list" ACL but denied by the "Extended IP access list check" ACL are dropped. |
| Current peer | Current peer that is being used for this crypto map entry. |
| Security association lifetime | Number of bytes that are allowed to be encrypted or decrypted or the age of the security association before new encryption keys must be negotiated. |
| PFS | (Perfect Forward Secrecy) If the field is marked as 'Yes', the Internet Security Association and Key Management Protocol (ISAKMP) SKEYID-d key is renegotiated each time security association (SA) encryption keys are renegotiated (requires another Diffie-Hillman calculation). If the field is marked as 'No', the same ISAKMP SKEYID-d key is used when renegotiating SA encryption keys. ISAKMP keys are renegotiated on a separate schedule, with a default time of 24 hours. |
| Transform sets | List of transform sets (encryption, authentication, and compression algorithms) that can be used with this crypto map. |
| Interfaces using crypto map test | Interfaces to which this crypto map is applied. Packets that are leaving from this interface are subject to the rules of this crypto map for encryption. Encrypted packets may enter the router on any interface, and they are decrypted. Nonencrypted packets that are entering the router through this interface are subject to the "reverse" crypto access list check. |

The following example displays output from the **show crypto map** command. No transform sets are configured for the crypto map "mymap," the default transform sets are enabled, and the crypto engine supports the encryption algorithm.

```
Router# show crypto map

Crypto Map "mymap" 1 ipsec-isakmp
  Peer = 209.165.201.1
  Extended IP access list 102
    access-list 102 permit ip 192.168.1.0 0.0.0.255 10.0.0.0 0.0.255.255
  Security association lifetime: 4608000 kilobytes/3600 seconds
  PFS (Y/N): N
  Transform sets={
    #!default_transform_set_1: { esp-aes esp-sha-hmac } ,
    #!default_transform_set_0: { esp-3des esp-sha-hmac } ,
  }
  Reverse Route Injection Enabled
  Interfaces using crypto map mymap:
```

The following example displays output of the **show crypto map** command. No transform sets configured for the crypto map "mymap" and the default transform sets have been disabled.

```
Router(config)# no crypto ipsec default transform-set
Router(config)# exit
Router# configure terminal
Router# show crypto map

Crypto Map "mymap" 1 ipsec-isakmp
```

```

Peer = 209.165.201.1
Extended IP access list 102
    access-list 102 permit ip 192.168.1.0 0.0.0.255 10.0.0.0 0.0.255.255
Security association lifetime: 4608000 kilobytes/3600 seconds
PFS (Y/N): N
Transform sets={
}
! There are no transform sets for the crypto map "mymap."
Reverse Route Injection Enabled
Interfaces using crypto map mymap:

```

The following example displays output for the **show crypto map** command and **gdoi fail-close** keywords (**show crypto map gdoi fail-close**). Fail-close has been activated. In addition, an implicit "permit ip any any" entry is configured, causing any traffic other than Telnet and Open Shortest Path First (OSPF) to be dropped:

```

Router# show crypto map gdoi fail-close 23

Crypto Map: "svn"
  Activate: yes
  Fail-Close Access-List: (Deny = Forward In Clear, Permit = Drop)
    access-list 105 deny tcp any port = 23 any
    access-list 105 deny ospf any any

```

Related Commands

| Command | Description |
|--|--|
| show crypto ipsec default transform-set | Displays the default IPsec transform sets. |
| show crypto ipsec transform-set | Displays the configured transform sets. |

show crypto mib ipsec flowmib endpoint

To display the IP Security (IPsec) phase-2 tunnel endpoint table, use the **show crypto mib ipsec flowmib endpoint** command in privileged EXEC mode.

show crypto mib ipsec flowmib endpoint [**vrf** *vrf-name*]

Syntax Description

| | |
|----------------------------|---|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|----------------------------|---|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines

The IPsec phase-2 tunnel endpoint table contains an entry for each active endpoint associated with an IPsec phase-2 tunnel.

Examples

The following example displays the IPsec phase 2 tunnel endpoint table for all VRFs:

```
Router# show crypto mib ipsec flowmib endpoint
vrf Global
  Index:                1
  Local type:           Single IP address
  Local address:        192.1.2.1
  Protocol:             0
  Local port:           0
  Remote type:          Single IP address
  Remote address:       192.1.2.2
  Remote port:          0
  Index:                2
  Local type:           Subnet
  Local address:        192.1.3.0 255.255.255.0
  Protocol:             0
  Local port:           0
  Remote type:          Subnet
  Remote address:       192.1.3.0 255.255.255.0
  Remote port:          0
```

The table below describes the significant fields shown in the display.

Table 34: show crypto mib ipsec flowmib endpoint Field Descriptions

| Field | Description |
|-------|---|
| Index | The number of the endpoint associated with the IPsec phase-2 tunnel table. The value of this index is a number which begins at one and is incremented with each endpoint associated with an IPsec phase-2 tunnel. The index value will wrap at 2,147,483,647. |

| Field | Description |
|----------------|--|
| Local type | The local endpoint identity type. The three possible values are a single IP address, an IP address range, or an IP subnet. |
| Local address | The first IP address of the local endpoint. If the local endpoint type is a single IP address, then the local address is the value of the IP address. If the local endpoint type is an IP address range, then the local address is the value of beginning IP address of the range. If the local endpoint type is an IP subnet, then the local address is the value of the subnet. |
| Protocol | The local endpoint traffic protocol number. |
| Local port | The local endpoint traffic port number. |
| Remote type | The remote endpoint identity type. The three possible values are a single IP address, an IP address range, or an IP subnet. |
| Remote address | The first IP address of the remote endpoint. If the remote endpoint type is a single IP address, then the remote address is the value of the IP address. If the remote endpoint type is an IP address range, then the remote address is the value of beginning IP address of the range. If the remote endpoint type is an IP subnet, then the remote address is the value of the subnet. |
| Remote port | The remote endpoint traffic port number. |

Related Commands

| Command | Description |
|--|--|
| show crypto mib ipsec flowmib failure | Displays statistics associated with IPsec phase-2 failure. |
| show crypto mib ipsec flowmib global | Displays IPsec phase-2 global statistics. |
| show crypto mib ipsec flowmib history | Displays statistics associated with previously active IPsec phase-2 tunnels. |
| show crypto mib ipsec flowmib spi | Displays the IPsec phase-2 security protection index (SPI) table. |
| show crypto mib ipsec flowmib tunnel | Displays statistics for all active IPsec phase-2 tunnels. |

show crypto mib ipsec flowmib failure

To display statistics associated with IP Security (IPsec) phase-2 failure, use the **show crypto mib ipsec flowmib failure** command in privileged EXEC mode.

```
show crypto mib ipsec flowmib failure [vrf vrf-name]
```

Syntax Description

| | |
|----------------------------|---|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|----------------------------|---|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays the IPsec phase 2 MIB failure table for all indexes and VRFs:

```
Router# show crypto mib ipsec flowmib failure
vrf Global
  Index:                1
  Reason:               Operation request
  Failure time since reset: 00:25:18
  Src address:         192.1.2.1
  Destination address: 192.1.2.2
  SPI:                 0
```

The table below describes the significant fields shown in the display.

Table 35: show crypto mib ipsec flowmib failure Field Descriptions

| Field | Description |
|-------|--|
| Index | The IPsec phase-2 failure table index. The value of the index is a number that begins at one and is incremented with each IPsec phase-1 failure. The index value will wrap at 2,147,483,647. |

| Field | Description |
|--------------------------|---|
| Reason | <p>The reason for the failure, which are:</p> <ul style="list-style-type: none"> • 1--All other reasons. • 2--An internal error occurred. • 3--A peer encoding error occurred. • 4--A proposal failure occurred. • 5--A protocol use failure occurred. • 6--The SA did not exist. • 7--A decryption failure occurred. • 8--An encryption failure occurred. • 9--An inbound authentication failure occurred. • 10--An outbound authentication failure occurred. • 11--A compression failure occurred. • 12--A system capacity failure occurred. • 13--A peer delete request was received. • 14--The contact with the peer was lost. • 15--The sequence rolled over. • 16--The operator requested tunnel termination. |
| Failure time since reset | The value of sysUpTime in hundredths of seconds at the time of the failure |

Related Commands

| Command | Description |
|---|--|
| show crypto mib ipsec flowmib endpoint | Displays IPsec phase-2 tunnel endpoint table. |
| show crypto mib ipsec flowmib global | Displays IPsec phase-2 global statistics. |
| show crypto mib ipsec flowmib history | Displays statistics associated with previously active IPsec phase-2 tunnels. |
| show crypto mib ipsec flowmib spi | Displays the IPsec phase-2 SPI table. |
| show crypto mib ipsec flowmib tunnel | Displays statistics for all active IPsec phase-2 tunnels. |

show crypto mib ipsec flowmib global

To display IP Security (IPsec) phase-2 global statistics, use the **show crypto mib ipsec flowmib global** command in privileged EXEC mode.

show crypto mib ipsec flowmib global [*vrf vrf-name*]

Syntax Description

| | |
|----------------------------|---|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|----------------------------|---|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays IPsec phase 2 global statistics for all VRFs:

```
Router# show crypto mib ipsec flowmib global
vrf Global
  Active Tunnels:                2
  Previous Tunnels:              0
  In octets:                      800
  Out octets:                    1408
  In packets:                     8
  Out packets:                    8
  Uncompressed encrypted bytes:  1408
  In packets drops:              0
  Out packets drops:             2
  In replay drops:                0
  In authentications:            8
  Out authentications:           8
  In decrypts:                   8
  Out encrypts:                   8
  Compressed bytes:              0
  Uncompressed bytes:            0
  In uncompressed bytes:         0
  Out uncompressed bytes:        0
  In decrypt failures:           0
  Out encrypt failures:          0
  No SA failures:                0
  Protocol use failures:         0
  System capacity failures:      0
  In authentication failures:    0
  Out authentication failures:   0
```

The table below describes the significant fields shown in the display.

Table 36: show crypto mib ipsec flowmib global Field Descriptions

| Field | Description |
|-------------------|---|
| Active Tunnels | The total number of currently active IPsec phase-2 tunnels. |
| Previous Tunnels | The total number of previously active IPsec phase-2 tunnels. |
| In octets | The total number of octets received by all current and previous IPsec phase-2 tunnels. The total number is accumulated before determining whether or not the packet should be decompressed. |
| Out octets | The total number of octets sent by all current and previous IPsec phase-2 Tunnels. The total number is accumulated after determining whether or not the packet should be compressed. |
| In packets drops | The total number of packets dropped during receive processing by all current and previous IPsec phase-2 tunnels. The total number does not include packets dropped due to anti-replay processing. |
| Out packets drops | The total number of packets dropped during send processing by all current and previous IPsec phase-2 tunnels. |
| In replay drops | The total number of packets dropped during receive processing due to anti-replay processing by all current and previous IPsec phase-2 tunnels. |
| No SA failures | The total number of non-existent SA inbound failures that occurred during processing of all current and previous IPsec phase-2 tunnels. |

Related Commands

| Command | Description |
|---|--|
| show crypto mib ipsec flowmib endpoint | Displays IPsec phase-2 tunnel endpoint table. |
| show crypto mib ipsec flowmib failure | Displays statistics associated with IPsec phase-2 failure. |
| show crypto mib ipsec flowmib history | Displays statistics associated with previously active IPsec phase-2 tunnels. |
| show crypto mib ipsec flowmib spi | Displays the IPsec phase-2 SPI table. |
| show crypto mib ipsec flowmib tunnel | Displays statistics for all active IPsec phase-2 tunnels. |

show crypto mib ipsec flowmib history

To display statistics associated with previously active IP Security (IPsec) phase-2 tunnels, use the **show crypto mib ipsec flowmib history** command in privileged EXEC mode.

show crypto mib ipsec flowmib history [*vrf vrf-name*]

Syntax Description

| | |
|----------------------------|---|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|----------------------------|---|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays the IPsec phase 2 history statistics for all VRFs:

```
Router# show crypto mib ipsec flowmib history
vrf Global
Reason:                               Operation request
Index:                                 1
Local address:                         192.1.2.1
Remote address:                        192.1.2.2
IPSEC keying:                          IKE
Encapsulation mode:                    1
Lifetime (KB):                         4608000
Lifetime (Sec):                        3600
Active time:                           00:24:32
Lifetime threshold (KB):               423559168
Lifetime threshold (Sec):              3590000
Total number of refreshes:             0
Expired SA instances:                  4
Current SA instances:                  4
In SA DH group:                        1
In sa encrypt algorithm:               des
In SA auth algorithm:                 rsig
In SA ESP auth algo:                  ESP_HMAC_SHA
In SA uncompress algorithm:           None
Out SA DH group:                       1
Out SA encryption algorithm:           des
Out SA auth algorithm:                 ESP_HMAC_SHA
Out SA ESP auth algorithm:             ESP_HMAC_SHA
Out SA uncompress algorithm:           None
In octets:                             400
Decompressed octets:                   400
In packets:                            4
In drops:                              0
In replay drops:                       0
In authentications:                    4
In authentication failures:            0
```

```

In decrypts:                4
In decrypt failures:        0
Out octets:                 704
Out uncompressed octets:    704
Out packets:               4
Out drops:                 1
Out authentications:       4
Out authentication failures: 0
Out encryptions:           4
Out encryption failures:   0
Compressed octets:         0
Decompressed octets:       0
Out uncompressed octets:    704

```

The table below describes the significant fields shown in the display.

Table 37: show crypto mib ipsec flowmib history Field Descriptions

| Field | Description |
|---------------------------|---|
| Reason | The reason the IPsec phase-2 tunnel was terminated, which are: <ul style="list-style-type: none"> • 1--All other reasons. • 2--The tunnel terminated normally. • 3--The operator requested the tunnel termination. • 4--A peer delete request was received. • 5--The contact with peer was lost. • 6--A local failure occurred. • 7--The operator initiated a check point request. |
| Index | The index of the IPsec phase-2 tunnel history table. The value of the index is an integer that begins at one and is incremented with each tunnel that ends. The index value will wrap at 2,147,483,647. |
| IPSEC keying | The type of key used by the IPsec phase-2 tunnel. |
| Total number of refreshes | The total number of SA refreshes performed. |
| In octets | The total number of octets received by the IPsec phase-2 tunnel. The value is accumulated before determining whether or not the packet should be decompressed. |
| In drops | The total number of packets dropped during receive processing by this IPsec phase-2 tunnel. The number of drops does not include packets dropped due to anti-replay processing. |
| In replay drops | The total number of packets dropped during receive processing due to anti-replay processing by the IPsec phase-2 tunnel. |

Related Commands

| Command | Description |
|---|--|
| show crypto mib ipsec flowmib endpoint | Displays IPsec phase-2 tunnel endpoint table. |
| show crypto mib ipsec flowmib failure | Displays statistics associated with IPsec phase-2 failure. |
| show crypto mib ipsec flowmib global | Displays IPsec phase-2 global statistics. |
| show crypto mib ipsec flowmib spi | Displays the IPsec phase-2 SPI table. |
| show crypto mib ipsec flowmib tunnel | Displays statistics for all active IPsec phase-2 tunnels. |

show crypto mib ipsec flowmib history failure size

To display the size of the IP Security (IPSec) failure history table, use the **show crypto mib ipsec flowmib history failure size** command in privileged EXEC mode.

show crypto mib ipsec flowmib history failure size

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.1(4)E | This command was introduced. |
| 12.2(4)T | This command was integrated into Cisco IOS Release 12.2(4)T. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines

Use the **show crypto mib ipsec flowmib history failure size** command to display the size of the failure history table.

Examples

The following is sample output from the **show crypto mib ipsec flowmib history failure size** command:

```
Router# show crypto mib ipsec flowmib history failure size
IPSec Failure Window size: 140
```

Related Commands

| Command | Description |
|--|---|
| crypto mib ipsec flowmib history failure size | Changes the size of the IPSec failure history table. |
| show crypto mib ipsec flowmib version | Displays the IPSec Flow MIB version used by the router. |

show crypto mib ipsec flowmib history tunnel size

To display the size of the IP Security (IPSec) tunnel history table, use the **show crypto mib ipsec flowmib history tunnel size** command in privileged EXEC mode.

```
show crypto mib ipsec flowmib history tunnel size
```

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.1(4)E | This command was introduced. |
| 12.2(4)T | This command was integrated into Cisco IOS Release 12.2(4)T. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines

Use the **show crypto mib ipsec flowmib history tunnel size** command to display the size of the tunnel history table.

Examples

The following is sample output from the **show crypto mib ipsec flowmib history tunnel size** command:

```
Router# show crypto mib ipsec flowmib history tunnel size
IPSec History Window Size: 130
```

Related Commands

| Command | Description |
|---|---|
| crypto mib ipsec flowmib history tunnel size | Changes the size of the IPSec tunnel history table. |
| show crypto mib ipsec flowmib version | Displays the IPSec Flow MIB version used by the router. |

show crypto mib ipsec flowmib spi

To display the IP Security (IPsec) phase-2 security protection index (SPI) table, use the **show crypto mib ipsec flowmib spi** command in privileged EXEC mode.

```
show crypto mib ipsec flowmib spi [vrf vrf-name]
```

| Syntax Description | vrf vrf-name | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|--------------------|--------------|---|
|--------------------|--------------|---|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Usage Guidelines

The IPsec phase-2 SPI table contains an entry for each active and expiring security association (SA).

Examples

The following example displays the IPsec phase-2 SPI table for all VRFs:

```
Router# show crypto mib ipsec flowmib spi
vrf Global
Tunnel Index:          1
SPI Index:             1
SPI Value:              0xCC57D053
SPI Direction:         In
SPI Protocol:          AH
SPI Status:             Active
SPI Index:             2
SPI Value:              0x68612DF
SPI Direction:         Out
SPI Protocol:          AH
SPI Status:             Active
SPI Index:             3
SPI Value:              0x56947526
SPI Direction:         In
SPI Protocol:          ESP
SPI Status:             Active
SPI Index:             4
SPI Value:              0x8D7C2204
SPI Direction:         Out
SPI Protocol:          ESP
SPI Status:             Active
```

The field descriptions in the display are self-explanatory.

Related Commands

| Command | Description |
|---|---|
| show crypto mib ipsec flowmib endpoint | Displays IPsec phase-2 tunnel endpoint table. |

| Command | Description |
|--|--|
| show crypto mib ipsec flowmib failure | Displays statistics associated with IPsec phase-2 failure. |
| show crypto mib ipsec flowmib global | Displays IPsec phase-2 global statistics. |
| show crypto mib ipsec flowmib history | Displays statistics associated with previously active IPsec phase-2 tunnels. |
| show crypto mib ipsec flowmib tunnel | Displays statistics for all active IPsec phase-2 tunnels. |

show crypto mib ipsec flowmib tunnel

To display statistics for all active IP Security (IPsec) phase-2 tunnels, use the **show crypto mib ipsec flowmib tunnel** command in privileged EXEC mode.

show crypto mib ipsec flowmib tunnel [**index** *tunnel-mib-index*] [**vrf** *vrf-name*]

| Syntax Description | | |
|--------------------------------------|---|--|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. | |
| index <i>tunnel-mib-index</i> | (Optional) Displays tunnel MIB information for the specified active tunnel. The tunnel MIB index is an integer, 0-65535. | |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays statistics for all active IPsec phase-2 tunnels for all tunnel indexes and VRFs:

```
Router# show crypto mib ipsec flowmib tunnel
vrf Global
  Index: 1
  Local address: 192.0.2.1
  Remote address: 192.0.2.2
  IPSEC keying: IKE
  Encapsulation mode: 1
  Lifetime (KB): 4608000
  Lifetime (Sec): 3600
  Active time: 00:05:46
  Lifetime threshold (KB): 64
  Lifetime threshold (Sec): 10
  Total number of refreshes: 0
  Expired SA instances: 0
  Current SA instances: 4
  In SA DH group: 1
  In sa encrypt algorithm: des
  In SA auth algorithm: rsig
  In SA ESP auth algo: ESP_HMAC_SHA
  In SA uncompress algorithm: None
  Out SA DH group: 1
  Out SA encryption algorithm: des
  Out SA auth algorithm: ESP_HMAC_SHA
  Out SA ESP auth algorithm: ESP_HMAC_SHA
  Out SA uncompress algorithm: None
  In octets: 400
  Decompressed octets: 400
  In packets: 4
```

```

In drops:                                0
In replay drops:                          0
In authentications:                       4
In authentication failures:                0
In decrypts:                              4
In decrypt failures:                       0
Out octets:                                704
Out uncompressed octets:                   704
Out packets:                               4
Out drops:                                 1
Out authentications:                       4
Out authentication failures:               0
Out encryptions:                           4
Out encryption failures:                   0
Compressed octets:                         0
Decompressed octets:                       0
Out uncompressed octets:                   704

```

The table below describes the significant fields shown in the display.

Table 38: show crypto mib ipsec flowmib tunnel Field Descriptions

| Field | Description |
|---------------------------|---|
| Index | The index of the IPsec phase-2 tunnel table. The index value is an integer that begins at one and is incremented with each tunnel that is created. The index value will wrap at 2,147,483,647. |
| Total number of refreshes | The total number of SA refreshes performed. |
| Current SA instances | The number of SA instances that are currently active or expiring. |
| In octets | The total number of octets received by the IPsec phase-2 tunnel. This total number is accumulated before determining whether or not the packet should be decompressed. |
| Decompressed octets | The total number of decompressed octets received by the IPsec phase-2 tunnel. The total number is accumulated after the packet is decompressed. If compression is not being used, the total number will match the value of cipSecTunInOctets. |
| In drops | The total number of packets dropped during receive processing by the IPsec phase-2 tunnel. This count does not include packets dropped due to anti-replay processing. |
| In replay drops | The total number of packets dropped during receive processing due to anti-replay processing by the IPsec phase-2 tunnel. |
| Out octets | The total number of octets sent by the IPsec phase-2 tunnel. This value is accumulated after determining whether or not the packet should be compressed. |

Related Commands

| Command | Description |
|---|--|
| show crypto mib ipsec flowmib endpoint | Displays IPsec phase-2 tunnel endpoint table. |
| show crypto mib ipsec flowmib failure | Displays statistics associated with IPsec phase-2 failure. |

| Command | Description |
|--|--|
| show crypto mib ipsec flowmib global | Displays IPsec phase-2 global statistics. |
| show crypto mib ipsec flowmib history | Displays statistics associated with previously active IPsec phase-2 tunnels. |
| show crypto mib ipsec flowmib spi | Displays the IPsec phase-2 SPI table. |

show crypto mib ipsec flowmib version

To display the IP Security (IPSec) MIB version used by the router, use the **show crypto mib ipsec flowmib version** command in privileged EXEC mode.

show crypto mib ipsec flowmib version

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

| Release | Modification |
|-------------|---|
| 12.1(4)E | This command was introduced. |
| 12.2(4)T | This command was integrated into Cisco IOS Release 12.2(4)T. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

Usage Guidelines Use the **show crypto mib ipsec flowmib version** command to display the MIB version used by the management applications to identify the feature set.



Note The MIB version can also be obtained by querying the MIB element cipSecMibLevel using Simple Network Management Protocol (SNMP).

Examples

The following is sample output from the **show crypto mib ipsec flowmib version** command:

```
Router# show crypto mib ipsec flowmib version
IPSec Flow MIB version: 1
```

| Command | Description |
|---|---|
| show crypto mib ipsec flowmib history failure size | Displays the size of the IPSec failure history table. |
| show crypto mib ipsec flowmib history tunnel size | Displays the size of the IPSec tunnel history table. |

show crypto mib isakmp flowmib failure

To display the statistics associated with an Internet Security Association and Key Management Protocol (ISAKMP) phase-1 failure, use the **show crypto mib isakmp flowmib failure** command in privileged EXEC mode.

```
show crypto mib isakmp flowmib failure [vrf vrf-name]
```

| Syntax Description | vrf vrf-name | (Optional) Displays the parameters for a specific Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|--------------------|--------------|--|
|--------------------|--------------|--|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following is sample output from the **show crypto mib isakmp flowmib failure** command:

```
vrf Global
Index: 1
Reason: peer lost
Failure time since reset: 00:07:27
Local type: ID_IPV4_ADDR
Local value: 192.0.2.1
Remote type: ID_IPV4_ADDR
Remote Value: 192.0.2.2
Local Address: 192.0.2.1
Remote Address: 192.0.2.2
Index: 2
Reason: peer lost
Failure time since reset: 00:07:27
Local type: ID_IPV4_ADDR
Local value: 192.0.3.1
Remote type: ID_IPV4_ADDR
Remote Value: 192.0.3.2
Local Address: 192.0.3.1
Remote Address: 192.0.3.2
Index: 3
Reason: peer lost
Failure time since reset: 00:07:32
Local type: ID_IPV4_ADDR
Remote type: ID_IPV4_ADDR
Remote Value: 192.0.2.2
Local Address: 192.0.2.1
Remote Address: 192.0.2.2
```

The table below describes the significant fields shown in the display.

Table 39: show crypto mib isakmp flowmib failure Field Descriptions

| Field | Description |
|--------------------------|---|
| Index | The IPsec phase-1 failure table index. The value of the index is a number that begins at one and is incremented with each IPsec phase-1 failure. The index value will wrap at 2,147,483,647. |
| Reason | The reason for the failure, which include: <ul style="list-style-type: none"> • 1--All other reasons. • 2--A peer delete request was received. • 3--The contact with peer was lost. • 4--A local failure occurred. • 5--An authentication failure occurred. • 6--A hash validation failure occurred. • 7--An encryption failure occurred. • 8--An internal error occurred. • 9--A system capacity failure occurred. • 10--A proposal failure occurred. • 11--The peer certificate was unavailable. • 12--The peer certificate was invalid. • 13--The local certificate expired. • 14--A certificate revoke list (CRL) failure occurred. • 15--A peer encoding error occurred. • 16--The SA did not exist. • 17--The operator requested tunnel termination. |
| Failure time since reset | The value of sysUpTime in hundredths of seconds at the time of the failure. |
| Local type | The type of local peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Local value | The value of the local peer identity. If the local peer type is an IP address, then the value is the IP address used to identify the local peer. If the local peer type is a hostname, then the value is the hostname used to identify the local peer. |

| Field | Description |
|----------------|---|
| Remote type | The type of remote peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Remote Value | The value of the remote peer identity. If the remote peer type is an IP address, then the value is the IP address used to identify the remote peer. If the remote peer type is a hostname, then the value is the hostname used to identify the remote peer. |
| Local Address | The IP address of the local peer. |
| Remote Address | The IP address of the remote peer. |

Related Commands

| Command | Description |
|---|---|
| show crypto ipsec transform-set | Displays configured IPsec transform sets. |
| show crypto map | Displays IPsec crypto map configurations. |
| show crypto mib isakmp flowmib global | Displays global ISAKMP statistics. |
| show crypto mib isakmp flowmib history | Displays statistics associated with previously active ISAKMP tunnels. |
| show crypto mib isakmp flowmib peer | Displays attributes for an ISKMP peer association. |
| show crypto mib isakmp flowmib tunnel | Displays statistics associated with active ISAKMP tunnels. |

show crypto mib isakmp flowmib global

To display the global Internet Security Association and Key Management Protocol (ISAKMP) phase-1 statistics, use the **show crypto mib isakmp flowmib global** command in privileged EXEC mode.

show crypto mib isakmp flowmib global [*vrf vrf-name*]

Syntax Description

| | |
|----------------------------|--|
| vrf <i>vrf-name</i> | (Optional) Displays the parameters for a specific Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|----------------------------|--|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays global ISAKMP statistics:

```
Router# show crypto mib isakmp flowmib global
vrf Global
  Active Tunnels:                3
  Previous Tunnels:              0
  In octets:                      2856
  Out octets:                     3396
  In packets:                     16
  Out packets:                    19
  In packets drop:                0
  Out packets drop:              0
  In notifys:                     4
  Out notifys:                    7
  In P2 exchg:                    3
  Out P2 exchg:                   6
  In P2 exchg invalids:           0
  Out P2 exchg invalids:         0
  In P2 exchg rejects:            0
  Out P2 exchg rejects:           0
  In IPSEC delete:                0
  Out IPSEC delete:               0
  SAs locally initiated:          3
  SAs locally initiated failed:   0
  SAs remotely initiated failed:  0
  System capacity failures:       0
  Authentication failures:        0
  Decrypt failures:               0
  Hash failures:                  0
  Invalid SPI:                    0
```

The table below describes the fields shown in the display.

Table 40: show crypto mib isakmp flowmib global Field Descriptions

| Field | Description |
|-----------------------|--|
| Active Tunnels | The number of currently active IPsec phase-1 IKE tunnels. |
| Previous Tunnels | The total number of previously active IPsec phase-1 IKE tunnels. |
| In octets | The total number of octets received by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out octets | The total number of octets sent by all currently and previously active and IPsec phase-1 IKE tunnels. |
| In packets | The total number of packets received by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out packets | The total number of packets sent by all currently and previously active and IPsec phase-1 tunnels. |
| In packets drop | The total number of packets that were dropped during receive processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out packets drop | The total number of packets that were dropped during send processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| In notifys | The total number of notifications received by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out notifys | The total number of notifications sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg | The total number of IPsec phase-2 exchanges received by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchg | The total number of IPsec phase-2 exchanges that were sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg invalids | The total number of IPsec phase-2 exchanges that were received and found to be invalid by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchg invalids | The total number of IPsec phase-2 exchanges that were sent and found to be invalid by all currently and previously active IPsec phase-1 tunnels. |
| In P2 exchg rejects | The total number of IPsec phase-2 exchanges that were received and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchg rejects | The total number of IPsec phase-2 exchanges that were sent and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| In IPSEC delete | The total number of IPsec phase-2 SA delete requests received by all currently and previously active and IPsec phase-1 IKE tunnels. |
| Out IPSEC delete | The total number of IPsec phase-2 SA delete requests sent by all currently and previously active IPsec phase-1 IKE tunnels. |

| Field | Description |
|-------------------------------|--|
| SAs locally initiated | The total number of IPsec phase-1 IKE tunnels that were locally initiated. |
| SAs locally initiated failed | The total number of IPsec phase-1 IKE tunnels that were locally initiated and failed to activate. |
| SAs remotely initiated failed | The total number of IPsec phase-1 IKE tunnels that were remotely initiated and failed to activate. |
| System capacity failures | The total number of system capacity failures that occurred during processing of all current and previously active IPsec phase-1 IKE tunnels. |
| Authentication failures | The total number of authentications that ended in failure by all current and previous IPsec phase-1 IKE tunnels. |
| Decrypt failures | The total number of decryptions that ended in failure by all current and previous IPsec phase-1 IKE tunnels. |
| Hash failures | The total number of hash validations that ended in failure by all current and previous IPsec phase-1 IKE tunnels. |
| Invalid SPI | The total number of non-existent SAs in failures which occurred during processing of all current and previous IPsec phase-1 IKE tunnels. |

Related Commands

| Command | Description |
|---|---|
| show crypto mib isakmp flowmib failure | Displays statistics associated with an ISAKMP failure. |
| show crypto mib isakmp flowmib history | Displays statistics associated with previously active ISAKMP tunnels. |
| show crypto mib isakmp flowmib peer | Displays attributes for an ISKMP peer association. |
| show crypto mib isakmp flowmib tunnel | Displays statistics associated with active ISAKMP tunnels. |

show crypto mib isakmp flowmib history

To display the statistics associated with previously active Internet Security Association and Key Management Protocol (ISAKMP) phase-1 tunnels, use the **show crypto mib isakmp flowmib history** command in privileged EXEC mode.

```
show crypto mib isakmp flowmib history [vrf vrf-name]
```

| Syntax Description | vrf vrf-name | (Optional) Displays the parameters for a specific Virtual Private Network (VPN) routing and forwarding (VRF) instance. |
|--------------------|--------------|--|
|--------------------|--------------|--|

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays previous ISAKMP phase-1 tunnel information for all VRFs:

```
Router# show crypto mib isakmp flowmib history
vrf Global
Reason: peer lost
Index: 2
Local type: ID_IPV4_ADDR
Local address: 192.0.2.1
Remote type: ID_IPV4_ADDR
Remote address: 192.0.2.2
Negotiation mode: Main Mode
Diffie Hellman Grp: 2
Encryption algo: des
Hash algo: sha
Auth method: psk
Lifetime: 86400
Active time: 00:06:30
Policy priority: 1
Keepalive enabled: Yes
In octets: 3024
In packets: 22
In drops: 0
In notifys: 18
In P2 exchanges: 1
In P2 exchg invalids: 0
In P2 exchg rejected: 0
In P2 SA delete reqs: 0
Out octets: 4188
Out packets: 33
Out drops: 0
Out notifys: 28
Out P2 exchgs: 2
Out P2 exchg invalids: 0
Out P2 exchg rejects: 0
```

```

Out P2 Sa delete requests:      0
Reason:                        peer lost
Index:                          3
Local type:                     ID_IPV4_ADDR
Local address:                  192.0.3.1
Remote type:                    ID_IPV4_ADDR
Remote address:                 192.0.3.2
Negotiation mode:              Main Mode
Diffie Hellman Grp:            2
Encryption algo:               des
Hash algo:                     sha
Auth method:                   psk
Lifetime:                      86400
Active time:                   00:06:25
Policy priority:               1
Keepalive enabled:             Yes
In octets:                      3140
In packets:                    23
In drops:                      0
In notifys:                    19
In P2 exchanges:               1
In P2 exchg invalids:         0
In P2 exchg rejected:         0
In P2 SA delete reqs:         0
Out octets:                    4304
Out packets:                   34
Out drops:                     0
Out notifys:                   29
Out P2 exchgs:                 2
Out P2 exchg invalids:        0
Out P2 exchg rejects:         0
Out P2 Sa delete requests:    0

```

The table below describes the significant fields shown in the display.

Table 41: show crypto mib isakmp flowmib history Field Descriptions

| Field | Description |
|--------|---|
| Reason | The reason the IPsec phase-1 IKE tunnel was terminated, which include: <ul style="list-style-type: none"> • 1--All other reasons. • 2--The tunnel terminated normally. • 3--The operator requested tunnel termination. • 4--A peer delete request was received. • 5--The contact with peer was lost. • 6--A local failure occurred. • 7--The operator initiated a check point request. |
| Index | The index of the IPsec phase-1 IKE tunnel history table. The value of the index is a number that begins at one and is incremented with each tunnel that ends. The value of this object will wrap at 2,147,483,647. |

| Field | Description |
|----------------------|---|
| Local type | The type of local peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Local address | The value of the local peer identity. If the local peer type is an IP address, then the value is the IP address used to identify the local peer. If the local peer type is a hostname, then the value is the hostname used to identify the local peer. |
| Remote type | The type of remote peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Remote address | The value of the remote peer identity. If the remote peer type is an IP address, then the value is the IP address used to identify the remote peer. If the remote peer type is a hostname, then the value is the hostname used to identify the remote peer. |
| Lifetime | The negotiated lifetime of the IPsec phase-1 IKE tunnel in seconds. |
| Active time | The length of time the IPsec phase-1 IKE tunnel has been active in hundredths of seconds. |
| In octets | The total number of octets received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In packets | The total number of packets received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In drops | The total number of packets that were dropped during receive processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| In notifys | The total number of notifications received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchanges | The total number of IPsec phase-2 exchanges received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg invalids | The total number of IPsec phase-2 exchanges that were received and found to be invalid by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg rejected | The total number of IPsec phase-2 exchanges that were received and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 SA delete reqs | The total number of IPsec phase-2 SA delete requests received by all currently and previously active and IPsec phase-1 IKE tunnels. |
| Out octets | The total number of octets sent by all currently and previously active and IPsec phase-1 IKE tunnels. |

| Field | Description |
|---------------------------|--|
| Out packets | The total number of packets sent by all currently and previously active and IPsec phase-1 tunnels. |
| Out drops | The total number of packets that were dropped during send processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out notifys | The total number of notifications sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchgs | The total number of IPsec phase-2 exchanges that were sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchg invalids | The total number of IPsec phase-2 exchanges that were sent and found to be invalid by all currently and previously active IPsec phase-1 tunnels. |
| Out P2 exchg rejects | The total number of IPsec phase-2 exchanges that were sent and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 Sa delete requests | The total number of IPsec phase-2 SA delete requests sent by all currently and previously active IPsec phase-1 IKE tunnels. |

Related Commands

| Command | Description |
|---|--|
| show crypto mib isakmp flowmib failure | Displays statistics associated with an ISAKMP failure. |
| show crypto mib isakmp flowmib global | Displays global ISAKMP statistics. |
| show crypto mib isakmp flowmib peer | Displays attributes for an ISKMP peer association. |
| show crypto mib isakmp flowmib tunnel | Displays statistics associated with active ISAKMP tunnels. |

show crypto mib isakmp flowmib peer

To display attributes for an active Internet Security Association and Key Management Protocol (ISAKMP) phase-1 peer association, use the **show crypto mib isakmp flowmib peer** command in privileged EXEC mode.

show crypto mib isakmp flowmib peer [**index** *peer-mib-index*] [**vrf** *vrf-name*]

| Syntax Description | index | <i>peer-mib-index</i> | (Optional) Displays MIB information for the specified peer. The peer MIB index is an integer, 0-65535. |
|--------------------|-------|-----------------------|---|
| | vrf | <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays ISAKMP peer information for all indexes and VRFs:

```
Router# show crypto mib isakmp flowmib peer
vrf Global
  Index:                1
  Local type:           ID_IPV4_ADDR
  Local address:        192.0.2.1
  Remote type:          ID_IPV4_ADDR
  Remote address:       192.0.2.2
  Index:                2
  Local type:           ID_IPV4_ADDR
  Local address:        192.0.3.1
  Remote type:          ID_IPV4_ADDR
  Remote address:       192.0.3.1
  Index:                3
  Local type:           ID_IPV4_ADDR
  Local address:        192.0.4.1
  Remote type:          ID_IPV4_ADDR
  Remote address:       192.0.4.1
```

The table below describes the significant fields shown in the display.

Table 42: show crypto mib isakmp flowmib peer Field Descriptions

| Field | Description |
|-------|---|
| Index | The index of the active IPsec phase-1 IKE tunnel for this peer association. If an IPsec phase-1 IKE tunnel is not currently active, then the value of this object will be zero. |

| Field | Description |
|----------------|---|
| Local type | The type of local peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Local address | The IP address of the local peer. |
| Remote type | The type of remote peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Remote address | The IP address of the remote peer. |

Related Commands

| Command | Description |
|---|---|
| show crypto mib isakmp flowmib failure | Displays statistics associated with an ISAKMP failure. |
| show crypto mib isakmp flowmib global | Displays global ISAKMP statistics. |
| show crypto mib isakmp flowmib history | Displays statistics associated with previously active ISAKMP tunnels. |
| show crypto mib isakmp flowmib tunnel | Displays statistics associated with active ISAKMP tunnels. |

show crypto mib isakmp flowmib tunnel

To display statistics associated with active Internet Security Association and Key Management Protocol (ISAKMP) phase-1 tunnels, use the **show crypto mib isakmp flowmib tunnel** command in privileged EXEC mode.

show crypto mib isakmp flowmib tunnel [*index tunnel-mib-index*] [*vrf vrf-name*]

| Syntax Description | index <i>tunnel-mib-index</i> | (Optional) Displays tunnel MIB information for the specified tunnel. The tunnel MIB index is an integer, 0-65535. |
|--------------------|-------------------------------|---|
| | vrf <i>vrf-name</i> | (Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(20)T | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following example displays ISAKMP tunnel information for all indexes and VRFs:

```
Router# show crypto mib isakmp flowmib tunnel
vrf Global
  Index: 1
  Local type: ID_IPV4_ADDR
  Local address: 192.0.2.1
  Remote type: ID_IPV4_ADDR
  Remote address: 192.0.2.2
  Negotiation mode: Main Mode
  Diffie Hellman Grp: 2
  Encryption algo: des
  Hash algo: sha
  Auth method: psk
  Lifetime: 86400
  Active time: 00:03:08
  Policy priority: 1
  Keepalive enabled: Yes
  In octets: 2148
  In packets: 15
  In drops: 0
  In notifys: 11
  In P2 exchanges: 1
  In P2 exchg invalids: 0
  In P2 exchg rejected: 0
  In P2 SA delete reqs: 0
  Out octets: 2328
  Out packets: 16
  Out drops: 0
  Out notifys: 12
```

```

Out P2 exchgs:                2
Out P2 exchg invalids:       0
Out P2 exchg rejects:        0
Out P2 Sa delete requests:   0

```

The table below describes the significant fields shown in the display.

Table 43: show crypto mib isakmp flowmib tunnel Field Descriptions

| Field | Description |
|--------------------|---|
| Index | The index of the IPsec phase-1 IKE tunnel table. The value of the index is a number that begins at one and is incremented with each tunnel that is created. The value of this object will wrap at 2,147,483,647. |
| Local type | The type of local peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Local address | The value of the local peer identity. If the local peer type is an IP address, then the local address is the IP address used to identify the local peer. If the local peer type is a hostname, then the local address is the hostname used to identify the local peer. |
| Remote type | The type of remote peer identity. <ul style="list-style-type: none"> • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type. |
| Remote address | The value of the remote peer identity. If the remote peer type is an IP address, then the remote address is the IP address used to identify the remote peer. If the remote peer type is a hostname, then the remote address is the hostname used to identify the remote peer. |
| Negotiation mode | The negotiation mode of the IPsec phase-1 IKE tunnel. |
| Diffie Hellman Grp | The Diffie Hellman group used in IPsec phase-1 IKE negotiations. |
| Encryption algo | The encryption algorithm used in IPsec phase-1 IKE negotiations. |
| Hash algo | The hash algorithm used in IPsec phase-1 IKE negotiations. |
| Auth method | The authentication method used in IPsec phase-1 IKE negotiations. |
| Lifetime | The negotiated lifetime of the IPsec phase-1 IKE tunnel in seconds |
| Active time | The length of time the IPsec phase-1 IKE tunnel has been active in hundredths of seconds. |
| In octets | The total number of octets received by all currently and previously active IPsec phase-1 IKE tunnels. |

| Field | Description |
|---------------------------|--|
| In packets | The total number of packets received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In drops | The total number of packets that were dropped during receive processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| In notifys | The total number of notifications received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchanges | The total number of IPsec phase-2 exchanges received by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg invalids | The total number of IPsec phase-2 exchanges that were received and found to be invalid by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 exchg rejected | The total number of IPsec phase-2 exchanges that were received and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| In P2 SA delete reqs | The total number of IPsec phase-2 SA delete requests received by all currently and previously active and IPsec phase-1 IKE tunnels. |
| Out octets | The total number of octets sent by all currently and previously active and IPsec phase-1 IKE tunnels. |
| Out packets | The total number of packets sent by all currently and previously active and IPsec phase-1 tunnels. |
| Out drops | The total number of packets that were dropped during send processing by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out notifys | The total number of notifications sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchgs | The total number of IPsec phase-2 exchanges that were sent by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 exchg invalids | The total number of IPsec phase-2 exchanges that were sent and found to be invalid by all currently and previously active IPsec phase-1 tunnels. |
| Out P2 exchg rejects | The total number of IPsec phase-2 exchanges that were sent and rejected by all currently and previously active IPsec phase-1 IKE tunnels. |
| Out P2 Sa delete requests | The total number of IPsec phase-2 SA delete requests sent by all currently and previously active IPsec phase-1 IKE tunnels. |

Related Commands

| Command | Description |
|---|--|
| show crypto mib isakmp flowmib failure | Displays statistics associated with an ISAKMP failure. |
| show crypto mib isakmp flowmib global | Displays global ISAKMP statistics. |

| Command | Description |
|--|---|
| show crypto mib isakmp flowmib history | Displays statistics associated with previously active ISAKMP tunnels. |
| show crypto mib isakmp flowmib peer | Displays attributes for an ISKMP peer association. |

show crypto pki benchmarks

To display benchmarking data for Public Key Infrastructure (PKI) performance monitoring and optimization that was collected, use the **show crypto pki benchmarks** command in privileged EXEC mode.

show crypto pki benchmarks [**failures**]

| | |
|---------------------------|---|
| Syntax Description | failures (Optional) Includes validation failures only. |
|---------------------------|---|

| | |
|----------------------|---------------------|
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|----------------------|---------------------|

| | | |
|------------------------|----------------|------------------------------|
| Command History | Release | Modification |
| | 15.1(3)T | This command was introduced. |

Usage Guidelines Use the **show crypto pki benchmarks** command to display benchmarking data for PKI performance monitoring and optimization that was collected.

The IOS PKI Performance Monitoring and Optimization feature enables you to collect the following types of PKI performance data:

- Time to validate entire certificate chain.
- Time to verify each certificate.
- Time to check revocation status for each certificate.
- Time to fetch certificate revocation list (CRL) database for each fetch location.
- Time to fetch Simple Certificate Enrollment Protocol (SCEP) method capabilities to retrieve the CRL.
- Time to process each CRL.
- Time to process the Online Certificate Status Protocol (OCSP) response. OCSP is a certificate revocation mechanism.
- Time to fetch Authentication, Authorization, and Accounting (AAA).
- CRL size.
- Validation result.
- Validation Bypass (pubkey cached).
- Method used to fetch a CRL.
- PKI session identifier.
- Crypto engine used (hardware, software, etoken).

Examples

The following example displays **show crypto pki benchmark** command output of all PKI benchmarking data:

```

Router# show crypto pki benchmark
Display Validation Benchmark Table
 4 Records collected
Validation Session 10006
  Start: 20:47:29.021 GMT Wed Oct 27 2010
  Duration: 756 ms
  Peer Certificate Serial Number (hex): 296ED1EB0000000052FA
  Pubkey Bypass: no
  Result: Success
  Size of Chain to Validate: 1
  Revocation Check for Certificate 1 of 1
    Start: 20:47:29.063 GMT Wed Oct 27 2010
    Duration: 714 ms
  CRL Fetch - http://msca-root/CertEnroll/msca-root.crl
    Start: 20:47:29.067 GMT Wed Oct 27 2010
    Duration: 661 ms
    Fetch Result: Success
  CRL Insert
    Start: 20:47:29.731 GMT Wed Oct 27 2010
    Duration: 24 ms
  CRL Size: 582
Validation Session 10007
  Start: 20:48:15.897 GMT Wed Oct 27 2010
  Duration: 26 ms
  Pubkey Bypass: no
  Result: Failed CRYPTO_CERT_EXPIRED
  Size of Chain to Validate: 1
Validation Session 10008
  Start: 20:49:08.916 GMT Wed Oct 27 2010
  Duration: 26 ms
  Pubkey Bypass: no
  Result: Failed CRYPTO_CERT_EXPIRED
  Size of Chain to Validate: 1
Validation Session 10009
  Start: 20:49:15.051 GMT Wed Oct 27 2010
  Duration: 32 ms
  Peer Certificate Serial Number (hex): 296ED1EB0000000052FA
  Pubkey Bypass: no
  Result: Success
  Size of Chain to Validate: 1
  Revocation Check for Certificate 1 of 1
    Start: 20:49:15.076 GMT Wed Oct 27 2010
    Duration: 6 ms
The following example displays show crypto pki benchmark
command output of a section filter in PKI benchmarking data:
Router# show crypto pki benchmark | section Revocation
  Revocation Check for Certificate 1 of 1
    Start: 20:47:29.063 GMT Wed Oct 27 2010
    Duration: 714 ms
  Revocation Check for Certificate 1 of 1
    Start: 20:49:15.076 GMT Wed Oct 27 2010
    Duration: 6 ms

```

Related Commands

| Command | Description |
|-----------------------------------|---|
| clear crypto pki benchmark | Clears PKI benchmarking performance monitoring and optimization data and releases all memory associated with this data. |
| crypto pki benchmark | Starts or stops benchmarking data for PKI performance monitoring and optimization. |

show crypto pki certificates

To display information about your certificate, the certification authority certificate (CA), and any registration authority (RA) certificates, use the **show crypto pki certificates** command in privileged EXEC mode.

show crypto pki certificates [*trustpoint-name* [**verbose**]]

| Syntax Description | |
|------------------------|--|
| <i>trustpoint-name</i> | (Optional) Name of the trustpoint. Using this argument indicates that only certificates that are related to the trustpoint are to be displayed. |
| verbose | (Optional) More detailed information is to be displayed. Note The verbose keyword can be used only if a trustpoint name is entered. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|--|
| 11.3 T | The show crypto ca certificates command was introduced. |
| 12.2(13)T | The <i>trustpoint-name</i> argument was added. |
| 12.3(7)T | This command replaced the show crypto ca certificates command. |
| 12.3(8)T | The verbose keyword was added. |
| 12.3(14)T | The command output was modified to include persistent self-signed certificate parameters. |
| 12.4(2)T | The command output was modified to include shadow public key infrastructure (PKI), or rollover, certificate details. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(22)T | The command output was modified to include X.509 certificate IP address extension information. |

Usage Guidelines

This command shows information about the following certificates:

- Your certificate, if you have requested one from the CA (see the **crypto pki enroll** command)
- The certificate of the CA, if you have received the certificate of the CA (see the **crypto pki authenticate** command)
- RA certificates, if you have received RA certificates (see the **crypto pki authenticate** command)
- A self-signed certificate, if one has been requested
- Shadow PKI, or rollover, certificate details, if one or more shadow PKI certificates exist

Examples

The following is sample output from the **show crypto pki certificates** command after you authenticated the CA by requesting the certificate of the CA and public key with the **crypto pki authenticate** command:

```
CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
```

The CA certificate might show Key Usage as "Not Set."

The following is sample output from the **show crypto pki certificates** command, and it shows the certificate of the router and the certificate of the CA. In this example, a single, general-purpose Rivest, Shamir, and Adelman (RSA) key pair was previously generated, and a certificate was requested but not received for that key pair.

```
Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
    Serial Number: 04806682
  Status: Pending
  Key Usage: General Purpose
  Fingerprint: 428125BD A3419600 3F6C7831 6CD8FA95 00000000
CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
```

Note that in the previous sample, the certificate status of the router shows "Pending." After the router receives its certificate from the CA, the Status field changes to "Available" in the **show** output.

The following is sample output from the **show crypto pki certificates** command, and it shows the certificates of two routers and the certificate of the CA. In this example, special-usage RSA key pairs were previously generated, and a certificate was requested and received for each key pair.

```
Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
  Status: Available
  Certificate Serial Number: 428125BDA34196003F6C78316CD8FA95
  Key Usage: Signature
```

```
Certificate
  Subject Name
    Name: myrouter.example.com
    IP Address: 10.0.0.1
  Status: Available
  Certificate Serial Number: AB352356AFCD0395E333CCFD7CD33897
  Key Usage: Encryption
```

```
CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
```

The following is sample output from the **show crypto pki certificates** command when the CA supports an RA. In this example, the CA and RA certificates were previously requested with the **crypto pki authenticate** command.

```

CA Certificate
  Status: Available
  Certificate Serial Number: 3051DF7123BEE31B8341DFE4B3A338E5F
  Key Usage: Not Set
RA Signature Certificate
  Status: Available
  Certificate Serial Number: 34BCF8A0
  Key Usage: Signature

RA KeyEncipher Certificate
  Status: Available
  Certificate Serial Number: 34BCF89F
  Key Usage: Encryption

```

The following is sample output from the **show crypto pki certificates** command using the optional *trustpoint-name* argument and **verbose** keyword. The output shows the certificate of a router and the certificate of the CA. In this example, general-purpose RSA key pairs were previously generated, and a certificate was requested and received for the key pair.

```

Certificate
  Status: Available
  Version: 3
  Certificate Serial Number: 18C1EE03000000004CBD
  Certificate Usage: General Purpose
  Issuer:
    cn=msca-root
    ou=pki msca-root
    o=company
    l=stown
    st=state
    c=US
    ea=user@example.com
  Subject:
    Name: myrouter.example.com
    hostname=myrouter.example.com
  CRL Distribution Points:
    http://msca-root/CertEnroll/msca-root.crl
  Validity Date:
    start date: 19:50:40 GMT Oct 5 2004
    end date: 20:00:40 GMT Oct 12 2004
  Subject Key Info:
    Public Key Algorithm: rsaEncryption
    RSA Public Key: (360 bit)
  Signature Algorithm: SHA1 with RSA Encryption
  Fingerprint MD5: 2B5F53E6 E3E892E6 3A9D3706 01261F10
  Fingerprint SHA1: 315D127C 3AD34010 40CE7F3A 988BBDA5 CD528824
  X509v3 extensions:
    X509v3 Key Usage: A0000000
      Digital Signature
      Key Encipherment
    X509v3 Subject Key ID: D156E92F 46739CBA DFE66D2D 3559483E B41ECCF4
    X509v3 Authority Key ID: 37F3CC61 AF5E7C0B 434AB364 CF9FA0C1 B17C50D9
  Authority Info Access:
  Associated Trustpoints: msca-root
  Key Label: myrouter.example.com
CA Certificate
  Status: Available
  Version: 3
  Certificate Serial Number: 1244325DE0369880465F977A18F61CA8
  Certificate Usage: Signature
  Issuer:
    cn=msca-root

```

```

ou=pki msca-root
o=company
l=town
st=state
c=US
ea=user@example.com
Subject:
cn=msca-root
ou=pki msca-root
o=company
l=town
st=state
c=US
ea=user@example.com
CRL Distribution Points:
http://msca-root.example.com/CertEnroll/msca-root.crl
Validity Date:
start date: 22:19:29 GMT Oct 31 2002
end date: 22:27:27 GMT Oct 31 2017
Subject Key Info:
Public Key Algorithm: rsaEncryption
RSA Public Key: (512 bit)
Signature Algorithm: SHA1 with RSA Encryption
Fingerprint MD5: 84E470A2 38176CB1 AA0476B9 C0B4F478
Fingerprint SHA1: 0F57170C 654A5D7D 10973553 EFB0F94F 2FAF9837
X509v3 extensions:
X509v3 Key Usage: C6000000
Digital Signature
Non Repudiation
Key Cert Sign
CRL Signature
X509v3 Subject Key ID: 37F3CC61 AF5E7C0B 434AB364 CF9FA0C1 B17C50D9
X509v3 Basic Constraints:
CA: TRUE
Authority Info Access:
Associated Trustpoints: msca-root

```

The following is sample output from the **show crypto pki certificates** command using the optional *trustpoint-name* argument and **verbose** keyword. The output shows the SIGNED PKCS10 fingerprint irrespective of the enrollment through a CA server or a RA server. Additionally, it displays the SIGNED PKCS10 SHA2 fingerprint along with SHA1 SIGNED PKCS10 fingerprint, and MD5 SIGNED PKCS10 fingerprint.

```

CA Certificate
Status: Available
Version: 3
Certificate Serial Number (hex): 01
Certificate Usage: Signature
Issuer:
cn=ca
Subject:
cn=ca
Validity Date:
start date: 22:55:38 IST Aug 25 2022
end date: 22:55:38 IST Aug 24 2025
Subject Key Info:
Public Key Algorithm: rsaEncryption
RSA Public Key: (2048 bit)
Signature Algorithm: MD5 with RSA Encryption
Fingerprint MD5: F6345AE9 3A554053 5F009F1A 4DD8F572
Fingerprint SHA1: 2E46DB45 03B2968A FB0B79B0 56C8E106 DB12529A
X509v3 extensions:
X509v3 Key Usage: 86000000

```

```

    Digital Signature
    Key Cert Sign
    CRL Signature
X509v3 Subject Key ID: 23B4C7F8 F3025142 18E60729 B4A98A3D 54277D5D
X509v3 Basic Constraints:
    CA: TRUE
X509v3 Authority Key ID: 23B4C7F8 F3025142 18E60729 B4A98A3D 54277D5D
    Authority Info Access:
Cert install time: 22:55:38 IST Aug 25 2022
Associated Trustpoints: test ca

```

```

Certificate
Subject:
  Name: Router
  Status: Pending
  Key Usage: General Purpose
  Certificate Request Fingerprint MD5 :CD76F722 60617951 DE5AF18D 3FC74A2A
  Certificate Request Fingerprint SHA1 :10A04557 9B5613B2 D0DD8AA5 72B0601B 05940E3D
  Certificate Request Fingerprint SHA2 :3E96A4CE 9824A2D4 07344A63 3D5EF642 7C53ADD0
B0C7B521 61DA06D8 289FA221
  Certificate Request Fingerprint MD5 (unsigned):D68D4DF6 84A58B40 76EBD026 40CE42B3
  Associated Trustpoint: test

```

The following example shows that a self-signed certificate has been created using a user-defined trustpoint:

```

Router Self-Signed Certificate
  Status: Available
  Certificate Serial Number: 01
  Certificate Usage: General Purpose
  Issuer:
    serialNumber=C63EBBE9+ipaddress=10.3.0.18+hostname=test.company.com
  Subject:
    Name: router.company.com
    IP Address: 10.3.0.18
    Serial Number: C63EBBE9
    serialNumber=C63EBBE9+ipaddress=10.3.0.18+hostname=test.company.com
  Validity Date:
    start date: 20:51:40 GMT Nov 29 2004
    end date: 00:00:00 GMT Jan 1 2020
  Associated Trustpoints: local

```

The following example shows that a shadow CA certificate, or rollover certificate, is available and shows its status:

```

Router# show crypto ca certificates
  Rollover Certificate
  Status: Waiting for rollover
  Certificate Serial Number: 3C
  Certificate Usage: General Purpose
  Issuer:
    cn=ezsdd
  Subject:
    Name: Router.company.com
    Serial Number: 3A9BEC55
    serialNumber=3A9BEC55+hostname=Router.company.com
  Validity Date:
    start date: 21:22:08 UTC Mar 17 2004
    end date: 21:22:08 UTC Mar 17 2005
    renew date: 00:00:00 UTC Jan 1 1970
  Associated Trustpoints: tti

```

Related Commands

| Command | Description |
|--------------------------------------|---|
| crypto pki authenticate | Authenticates the CA (by obtaining the certificate of the CA). |
| crypto pki enroll | Obtains the certificates of your router from the CA. |
| debug crypto pki messages | Displays debug messages for the details of the interaction (message dump) between the CA and the route. |
| debug crypto pki transactions | Displays debug messages for the trace of interaction (message type) between the CA and the router. |

show crypto pki certificates pem

To display information about the PKI certificates associated with trustpoint in PEM (Privacy Enhanced Mail) format, use the **show crypto pki certificates pem** command in privileged EXEC mode.

show crypto pki certificates pem [*trustpoint-name*]

| Syntax Description | |
|--------------------|--|
| | <i>trustpoint-name</i> (Optional) Name of the trustpoint. Using this argument indicates that only certificates that are related to the trustpoint are to be displayed. |

| Command Modes | |
|---------------|---------------------|
| | Privileged EXEC (#) |

| Command History | Release | Modification |
|-----------------|--------------------|------------------------------|
| | IOS XE Fuji 16.9.1 | This command was introduced. |

Examples

The following is sample output from the **show crypto pki certificates pem** command :

```
Router# show crypto pki certificates pem
-----Trustpoint: TP-self-signed-777972883-----
% The specified trustpoint is not enrolled (TP-self-signed-777972883).
% Only export the CA certificate in PEM format.
% Error: failed to get CA cert.
-----Trustpoint: rootca-----
% The specified trustpoint is not enrolled (rootca).
% Only export the CA certificate in PEM format.
% CA certificate:
-----BEGIN CERTIFICATE-----
MIICAzCCAwygAwIBAgIBAjANBgkqhkiG9w0BAQ0FADAVMRMwEQYDVQQDEwpsSQ0Ex
IEM9cGtpMB4XDTE4MDYwMzAxMzQ1NloXDTE5MDYwMjAxMzQ1NlowFTETMBEgAlUE
AxMKUknBMSBDPXBraTCBnzANBgkqhkiG9w0BAQEFAAOBjQAwgYkCgYEAARk9PiyN
Oz8cGaGm1TvfYYJ3AFEjV6lcFB5N57FH70/J3MDri32oHSDjJaS1PIfRn2H2OuUq
gnJBgvPeM66lmrt7nG9Nnf1EsKt4n2NcdAzBAXPOMEN+ppL03PqxW514KwwBQ++k
ukJCzeIPd925aMDIte8qP9MxPG9J2T4S2Y0CAwEAAaAjMGEwDwYDVR0TAQH/BAUw
AwEB/zAOBgNVHQ8BAf8EBAMCAYYwHwYDVR0jBBgwFoAURuQoekWXHhkEq1fXjoJJ
VP+ch5AwHQYDVR0OBBYEFEBkKHpFlx4ZBKtX146CSVT/nB+QMA0GCSqGSIs3DQEB
DQUAA4GBAfrMgQAQYLsd1WhH886q6HHJbiFMYPlcVsEFoVxnmct0ZLUIYiX4v6WyH
X/VGMRIkvOKu9ZnbYcsFdqcHV+YYOjI4hj5U+5WTM8hWIVDe9vpo2N4lJtaPQb5y
JsMckqQtFtOtgBqYzB2Uze0GqepRk+lGgnYmf6cUYwbZXQem8a32
-----END CERTIFICATE-----

-----Trustpoint: test-----
% CA certificate:
-----BEGIN CERTIFICATE-----
MIICAzCCAwygAwIBAgIBAjANBgkqhkiG9w0BAQ0FADAVMRMwEQYDVQQDEwpsSQ0Ex
IEM9cGtpMB4XDTE4MDYwMzAxMzQ1NloXDTE5MDYwMjAxMzQ1NlowFTETMBEgAlUE
AxMKUknBMSBDPXBraTCBnzANBgkqhkiG9w0BAQEFAAOBjQAwgYkCgYEAARk9PiyN
Oz8cGaGm1TvfYYJ3AFEjV6lcFB5N57FH70/J3MDri32oHSDjJaS1PIfRn2H2OuUq
gnJBgvPeM66lmrt7nG9Nnf1EsKt4n2NcdAzBAXPOMEN+ppL03PqxW514KwwBQ++k
ukJCzeIPd925aMDIte8qP9MxPG9J2T4S2Y0CAwEAAaAjMGEwDwYDVR0TAQH/BAUw
AwEB/zAOBgNVHQ8BAf8EBAMCAYYwHwYDVR0jBBgwFoAURuQoekWXHhkEq1fXjoJJ
VP+ch5AwHQYDVR0OBBYEFEBkKHpFlx4ZBKtX146CSVT/nB+QMA0GCSqGSIs3DQEB
DQUAA4GBAfrMgQAQYLsd1WhH886q6HHJbiFMYPlcVsEFoVxnmct0ZLUIYiX4v6WyH
```

show crypto pki certificates pem

```
X/VGMRIkvOKu9ZnbYcsFdqcHV+YYOjI4hj5U+5WTM8hWIVDe9vpo2N4lJtaPQb5y
JsMckgQtFtOtqBqYzB2Uze0GqeprK+lGgnYmf6cUYwbZXQem8a32
-----END CERTIFICATE-----
```

```
% General Purpose Certificate:
```

```
-----BEGIN CERTIFICATE-----
```

```
MIICAzCCAWygAwIBAgIBBDANBgkqhkiG9w0BAQ0FADAVMRMwEQYDVQQDEwpsQ0Ex
IEM9cGtpMB4XDTE4MDYwMzAxMzYxOVoXDTE5MDYwMjAxMzQ1NlowKTERMA8GA1UE
AxMIUjEgQzlw2kxFDASBgkqhkiG9w0BCQIWBXBraV9hMIGfMA0GCSqGSIb3DQEBA
QUAA4GNADCBiQKBgQDNt5ivJHXfSk3VJsYCzcJzWPLZCkvn+ljlqy5UlcfutVUT
olcZnDGTks39KPYHvb27dyEmH5SmI7aUqWb59gMnWctqbKDuOitjncV/7UBvL59
LeDs0tmFpSS/3qohR9fUWhmCBYwzFOqn6TmshSojha/53lhxPjPB32g7r9XS0wID
AQABo08wTTALBgNVHQ8EBAMCBAAwHwYDVR0jBBgwFoAURuQoekWXHhkEq1fXjoJJ
VP+cH5AwHQYDVR0OBBYEFO+7q9HuzMgOPK5ZsMasYzORBwrBMA0GCSqGSIb3DQEBA
DQUAA4GBAIZZ+BhaW3aRKMN/HHsaMtAkQ4vIchrGrVDx6elvyNyUE5rN+oJIWPT6
gp97rAmgQK9aWlOrrG6l5urcK/y/szA2xClbGMXMF2jvOerbiUSP0q8V0blafBy
UawecQ6HKgmAEuVHgg4invc9jA6IGLtcj55J1iLum/MCikC700rg
-----END CERTIFICATE-----
```


show crypto pki certificates storage

To display the current public key infrastructure (PKI) certificate storage location, use the **show crypto pki certificates storage** command in privileged EXEC mode.

show crypto pki certificates storage

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 12.4(2)T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |

Usage Guidelines

Use the **show crypto pki certificates storage** command to display the current PKI certificate storage location.

Examples

The following is sample output for the **show crypto pki certificates storage** command where the certificates are stored in the certs subdirectory of disk0:

```
Router# show crypto pki certificates storage
Certificates will be stored in disk0:/certs/
```

Related Commands

| Command | Description |
|---------------------------------------|--|
| crypto pki certificate storage | Specifies local storage device for PKI certificates. |

show crypto pki counters

To display the public key infrastructure (PKI) counters that are configured on the router, use the **show crypto pki counters** command in privileged EXEC mode.

show crypto pki counters

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.4(13)T | This command was introduced. |

Examples

The following example shows the listing of all PKI counters that are configured in a router:

```
Router# show crypto pki counters
PKI Sessions Started: 5
PKI Sessions Ended: 5
PKI Sessions Active: 0
Successful Validations: 1
Failed Validations: 4
Bypassed Validations: 0
Pending Validations: 0
CRLs checked: 3
CRL - fetch attempts: 2
CRL - failed attempts: 0
AAA authorizations: 0
```

The table below describes the significant fields shown in the display.

Table 44: show crypto pki counters Field Descriptions

| Field | Description |
|------------------------|---|
| PKI Sessions Started | Number of PKI sessions that are started in a router. |
| PKI Sessions Ended | Number of PKI sessions that are ended in a router. |
| PKI Sessions Active | Number of PKI sessions that are actively running in a router. |
| Successful Validations | Number of successful PKI counter validations in a router. |
| Failed Validations | Number of failed PKI counter validations in a router. |
| Bypassed Validations | Number of validations that were bypassed during a PKI counter validation in a router. |
| Pending Validations | Number of pending PKI counter validations in a router. |
| CRLs checked | Number of certificate revocation lists (CRLs) that are checked in a PKI session. |

| Field | Description |
|-----------------------|---|
| CRL - fetch attempts | Number of times a CRL is queried and fetched. |
| CRL - failed attempts | Number of times failed in querying and fetching a CRL. |
| AAA authorizations | Number of authentication, authorization, and accounting (AAA) authorizations that were used to create named methods lists in a PKI session. |

Related Commands

| Command | Description |
|-------------------------------------|---|
| show crypto pki certificates | Displays information about the certification authority certificate and any RA certificates. |
| show crypto pki crls | Displays the current CRL on the router. |
| show crypto pki server | Displays the current state and configuration of the certificate server. |
| show crypto pki timers | Displays the status of the managed timers that are maintained by Cisco IOS for PKI. |
| show crypto pki token | Displays the Cisco IOS PKI tokens that are configured on the router. |
| show crypto pki trustpoints | Displays the Cisco IOS PKI trustpoints that are configured in the router. |

show crypto pki crls

To display the current certificate revocation list (CRL) on the router, use the **show crypto pki crls** command in privileged EXEC mode.

show crypto pki crls

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.1 | The show crypto ca crls command was introduced. |
| 12.3(7)T | This command replaced the show crypto ca crls command. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.(33)SXH. |
| 12.4(20)T | The output of this command was updated to include information on the CRL cache size if set by the crypto pki crl cache command. |
| Cisco IOS XE Release 2.4 | This command was implemented on the Cisco ASR 1000 series routers. |

Examples

The following is sample output of the **show crypto pki crls** command:

```
Router# show crypto pki crls

CRL Issuer Name:
OU = vpn, O = company, C = us
LastUpdate: 16:17:34 PST Jan 10 2002
NextUpdate: 17:17:34 PST Jan 11 2002
Retrieved from CRL Distribution Point:
```

LDAP: CN = CRL1, OU = vpn, O = company, C = us

The following is sample output of the **show crypto pki crls** command with the maximum CRL cache size set to 2048 bytes:

```
Router# show crypto pki crls

CRL Issuer Name:
cn=ioscs,l=Anytown,c=US
LastUpdate: 02:53:41 GMT Mar 6 2007
NextUpdate: 02:53:41 GMT Mar 13 2007
Retrieved from CRL Distribution Point:
** CDP Not Published - Retrieved via SCEP
CRL DER is 475 bytes
CRL is stored in parsed CRL cache
Parsed CRL cache current size is 1705 bytes
Parsed CRL cache maximum size is 2048 bytes
```

Related Commands

| Command | Description |
|-------------------------------|--|
| crypto pki crl cache | Sets the maximum amount of volatile memory used to cache CRLs. |
| crypto pki crl request | Requests that a new CRL be obtained immediately from the CA. |

show crypto pki server

To display the current state and configuration of the certificate server, use the **show crypto pki server** command in privileged EXEC mode.

show crypto pki server [*cs-label*]

Syntax Description

| | |
|-----------------|---|
| <i>cs-label</i> | (Optional) Name of the certificate server. The name must match the name specified through the crypto pki server command. |
|-----------------|---|

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

| Release | Modification |
|----------|--|
| 12.3(4)T | This command was introduced. |
| 12.4(2)T | The command output was modified to include shadow, or rollover, public key infrastructure (PKI) certificate information. |
| 15.0(1)M | The command output was modified. <ul style="list-style-type: none"> To include whether the server is configured for redundancy and whether its state is active or standby or simplex (active, but standby is not up). To show the high availability (HA) status while the Hot Standby Router Protocol (HSRP) is coming up. |

Usage Guidelines

At startup, the certificate server must check the current configuration before issuing any certificates. As it starts up, the certificate server transitions through the states defined in the table below. Use the **show crypto pki server** command to display the state of the certificate server.

Table 45: Certificate Server Startup State Descriptions

| Certificate Server State | Description |
|----------------------------------|--|
| configured | The server is available and has generated the certificate server certificates. |
| storage configuration incomplete | The server is verifying that the configured storage location is available. |
| waiting for HTTP server | The server is verifying that the HTTP server is running. |
| waiting for time setting | The server is verifying that the time has been set. |

Examples

The following is sample output from the **show crypto pki server** command:

```
Router# show crypto pki server
Certificate Server status: disabled, storage configuration incomplete
```

```

Granting mode is: manual
Last certificate issued serial number: 0
CA certificate expiration timer: 21:29:38 GMT Jun 5 2006
CRL NextUpdate timer: 21:31:39 GMT Jun 6 2003
Current storage dir:
ftp://myftpserver
Database Level: Minimum - no cert data written to storage

```

The table below describes the significant fields shown in the display.

Table 46: show crypto pki server Field Descriptions

| Field | Description |
|---------------------------------------|---|
| Granting mode is | Specifies whether certificate enrollment requests should be granted manually (which is the default) or automatic (through the grant automatic command). Note The grant automatic command should be used <i>only</i> when testing and building simple networks. This command <i>must</i> be disabled before the network is accessible by the Internet. |
| Last certificate issued serial number | The serial number of the latest certificate. (To specify the distinguished name (DN) as the certification authority (CA) issuer name, use the issuer-name command.) |
| CA certificate expiration timer | The expiration date for the CA certificate. (To specify the expiration date, use the lifetime command.) |
| CRL NextUpdate timer | The next time the certificate revocation list (CRL) will be updated. (To specify the CRL lifetime, in hours, use the lifetime crl command.) |
| Current storage dir | The location where all database entries for the certificate server will be written out. (To specify a location, use the database url command.) |
| Database Level | The type of data that is stored in the certificate enrollment database--Minimum, names, or complete. (To specify the data type to be stored, use database level command.) |

The following is sample output from the **show crypto pki server** command when redundancy is configured and its state is simplex:

```

Router# show crypto pki server cert1

Certificate Server cert1:
  Status: disabled
  State: disabled
  Server's configuration is unlocked (enter "no shut" to lock it)
  Issuer name: CN=cert1
  CA cert fingerprint: -Not found-
  Granting mode is: manual
  Last certificate issued serial number (hex): 0
  CA certificate expiration timer: 00:00:00 UTC Jan 1 1970
  CRL not present.
  Current primary storage dir: nvram:
  Database Level: Minimum - no cert data written to storage
  Redundancy configured. Simplex mode.

```

The following is sample output from the **show crypto pki server** command when redundancy is configured and its state is active:

```

Certificate Server HA:
  Status: enabled
  State: enabled
  Server's configuration is locked (enter "shut" to unlock it)
  Issuer name: CN=ioscs,L=Santa Cruz,C=US
  CA cert fingerprint: 42308002 188180FC 9265946F FDC68A52
  Granting mode is: auto
  Last certificate issued serial number (hex): 2
  CA certificate expiration timer: 20:22:55 PST Apr 26 2013
  CRL NextUpdate timer: 20:27:46 PST May 11 2010
  Current primary storage dir: nvram:
  Database Level: Complete - all issued certs written as <serialnum>.cer
  Redundancy configured. This is active.

```

The following is sample output from the **show crypto pki server** command when redundancy is configured and its state is standby:

```

Certificate Server HA:
  Status: enabled
  State: enabled
  Server's configuration is locked (enter "shut" to unlock it)
  Issuer name: CN=ioscs,L=Santa Cruz,C=US
  CA cert fingerprint: 42308002 188180FC 9265946F FDC68A52
  Granting mode is: auto
  Last certificate issued serial number (hex): 2
  CA certificate expiration timer: 20:22:55 PST Apr 26 2013
  CRL NextUpdate timer: 20:27:46 PST May 11 2010
  Current primary storage dir: nvram:
  Database Level: Complete - all issued certs written as <serialnum>.cer
  Redundancy configured. This is standby.

```

The following example shows that the certificate server MyCS has rollover configured. Rollover has not yet occurred. The rollover status "pending" and rollover CA certificate timer show when the rollover timer will be triggered. When this timer is triggered, the shadow certificate will become the active certificate and the previously active certificate will be deleted.

```

Router# show crypto pki server
Certificate Server routercs:
  Status: enabled, configured
  Issuer name: CN=walnutcs
  CA cert fingerprint: 800F5944 74337E5B C2DF6C52 9A7B1BDB
  Granting mode is: auto
  Last certificate issued serial number: 0x6
  CA certificate expiration timer: 22:10:29 GMT Jan 29 2007
  CRL NextUpdate timer: 21:50:56 GMT Mar 5 2004
  Current storage dir: nvram:
  Database Level: Minimum - no cert data written to storage
  Rollover status: pending
  Rollover CA certificate timer: 20:34:23 GMT Jan 8 2005

```

The following example shows that the certificate server MyCS has rollover configured. The rollover time has occurred and the rollover certificate is available. The status shows the rollover certificate fingerprint and rollover CA certificate expiration timer information.

```

Router# show crypto pki server
Certificate Server routercs:
  Status: enabled, configured
  Issuer name: CN=walnutcs
  CA cert fingerprint: 800F5944 74337E5B C2DF6C52 9A7B1BDB
  Granting mode is: auto
  Last certificate issued serial number: 0x7
  CA certificate expiration timer: 22:10:29 GMT Jan 29 2007
  CRL NextUpdate timer: 21:50:56 GMT Mar 5 2004

```



```

Current storage dir: nvram:
Database Level: Minimum - no cert data written to storage
Rollover status: available for rollover
Rollover CA cert fingerprint: 6AAF5944 74227A5B 23DF3E52 9A7F1FEF
Rollover CA certificate expiration timer: 22:10:29 GMT Jan 29 2017

```

The following example shows a certificate server (CS) that has been prevented from entering rollover state because the Cisco IOS configuration cannot be saved.

```

Router# show crypto pki server
Certificate Server routercs:
  Status: enabled, configured
  Issuer name: CN=walnutcs
  CA cert fingerprint: 800F5944 74337E5B C2DF6C52 9A7B1BDB
  Granting mode is: auto
  Last certificate issued serial number: 0x7
  CA certificate expiration timer: 22:10:29 GMT Jan 29 2007
  CRL NextUpdate timer: 21:50:56 GMT Mar 5 2004
  Current storage dir: nvram:
  Database Level: Minimum - no cert data written to storage
  Rollover status: disabled, unable to save configuration
  Rollover CA cert fingerprint: 6AAF5944 74227A5B 23DF3E52 9A7F1FEF
  Rollover CA certificate expiration timer: 22:10:29 GMT Jan 29 2017

```

Related Commands

| Command | Description |
|--------------------------|---|
| crypto pki server | Enables a Cisco IOS certificate server and enter certificate server configuration mode. |

show crypto pki server certificates

To display certificate information for all certificates of the specified certificate server, use the **show crypto pki server certificates** command in privileged EXEC mode.

show crypto pki server *cs-label* **certificates** [*start-number* [*end-number*]] [**expired**]

Syntax Description

| | |
|---------------------|---|
| <i>cs-label</i> | Name of the certificate server. The name must match the name specified through the crypto pki server command. |
| <i>start-number</i> | (Optional) The beginning of the certificate serial number range to display. If only the starting certificate serial number is indicated, information for only the designated certificate is shown if available. |
| <i>end-number</i> | (Optional) The end of the certificate serial number range to display. |
| expired | (Optional) Displays the expired certificates. |

Command Default

Certificate information is shown for all serial numbers for the specified certificate server, from the first serial number in the certificate database to the last serial number in the certificate database.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.4(20)T | This command was introduced. |

Usage Guidelines

This command displays available information on each certificate for the specified certificate server. If the certificate information is not available, the output displayed reads as "<cert not available>". If the certificate information is incomplete, or if it has been corrupted, the output displayed reads as "<certificate incomplete or corrupted>".

You may display information on all the certificates in the certificate database, one certificate in the certificate database, or a range of certificates in the certificate database by setting the *start-number* and *end-number* arguments.

Examples

The following example shows the listing of all certificates in the certificate database for the certificate server "mycs":

Router#

show crypto pki server mycs certificates

```

Serial    Issued date                Expire date                Subject Name
1         02:09:09 PST Jan 22 2007   02:09:09 PST Jan 21 2010   cn=company
2         02:57:59 PST Jan 22 2007   02:57:59 PST Jan 22 2008   hostname=client.example.com
3         03:00:12 PST Jan 22 2007   03:00:12 PST Jan 22 2008   hostname=client.example.com
4         19:53:07 PST Jan 18 2007   19:53:07 PST Jan 19 2007   hostname=client.example.com
5         <cert not available>
6         <cert not available>
7         <cert not available>
8         02:57:59 PST Jan 22 2007   02:57:59 PST Jan 22 2008   hostname=client.example.com

```

```

9      <Certificate incomplete or corrupted>
A      <cert not available>

```

B <cert not available>

The following example shows the information for certificate serial number 3 in the certificate database for the certificate server "mycs":

Router#

```
show crypto pki server mycs certificates start 3
```

```

Serial    Issued date                Expires date                Subject Name
3         03:00:12 PST Jan 22 2007   03:00:12 PST Jan 22 2008   hostname=client.example.com

```

The following example shows the information for certificate serial number 3 through certificate serial number 7 in the certificate database for the certificate server "mycs":

Router#

```
show crypto pki server mycs certificates start 3 end 7
```

```
show crypto pki server mycs certificates
```

```

Serial    Issued date                Expires date                Subject Name
3         03:00:12 PST Jan 22 2007   03:00:12 PST Jan 22 2008   hostname=client.example.com
4         19:53:07 PST Jan 18 2007   19:53:07 PST Jan 19 2007   hostname=client.example.com
5         <cert not available>
6         <cert not available>
7         <cert not available>

```

Related Commands

| Command | Description |
|-----------------------------------|--|
| crypto pki server | Enables a Cisco IOS certificate server and enters certificate server configuration mode. |
| show crypto pki server | Displays the current state and configuration of the certificate server. |
| show crypto pki server crl | Displays the current status of the CRL. |

show crypto pki server crl

To display information regarding the status of the current certificate revocation list (CRL), use the **show crypto pki server crl** command in privileged EXEC mode.

show crypto pki server *cs-label* crl

Syntax Description

| | |
|-----------------|--|
| <i>cs-label</i> | Name of the certificate server. The name must match the name specified via the crypto pki server command. |
|-----------------|--|

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.4(20)T | This command was introduced. |

Usage Guidelines

CRLs are issued once every specified time period via the **lifetime crl** command. It is the responsibility of the network administrator to ensure that the CRL is available from the location that is specified via the **cdp-url** command. To access information, such as the lifetime and location of the CRL, use the **show crypto pki server crl** command.

Examples

The following example shows how to access CRL information for the certificate server "mycs":

```
Router# show crypto pki server mycs crl
```

Related Commands

| Command | Description |
|--------------------------|---|
| cdp-url | Specifies a CDP to be used in certificates that are issued by the certificate server. |
| crypto pki server | Enables a Cisco IOS certificate server and enter certificate server configuration mode. |
| lifetime crl | Defines the lifetime of the CRL that is used by the certificate server. |

show crypto pki server requests

To display all outstanding certificate enrollment requests, use the **show crypto pki server requests** command in privileged EXEC mode.

show crypto pki server *cs-label* requests

| | | |
|---------------------------|-----------------|--|
| Syntax Description | <i>cs-label</i> | Name of the certificate server. The name must match the name specified via the crypto pki server command. |
|---------------------------|-----------------|--|

Command Default None

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|------------------------|----------------|------------------------------|
| | 12.4(20)T | This command was introduced. |

Usage Guidelines A certificate enrollment request functions as follows:

- The certificate server receives the enrollment request from an end user, and the following actions occur:
 - A request entry is created in the enrollment request database with the initial state. (See the **show pki server** command for a complete list of certificate enrollment request states.)
 - The certificate server refers to the command-line interface (CLI) configuration (or the default behavior any time a parameter is not specified) to determine the authorization of the request. Thereafter, the state of the enrollment request is updated in the enrollment request database.
- At each Simple Certificate Enrollment Protocol (SCEP) query for a response, the certificate server examines the current request and performs one of the following actions:
 - Responds to the end user with a "pending" or "denied" state.
 - Forwards to the request to the certification authority (CA) core, where it will generate and sign the appropriate certificate, store the certificate in the enrollment request database, and return the request to the built-in certificate server SCEP server, who will reply to the end user with the certificate on the next SCEP request.

If the connection of the client has closed, the certificate server will wait for the client user to request another certificate.

All enrollment requests transitions through the certificate enrollment states that are defined in the table below.

Table 47: Certificate Enrollment Request State Descriptions

| Certificate Enrollment State | Description |
|-------------------------------------|--|
| authorized | The certificate server has authorized the request. |

| Certificate Enrollment State | Description |
|------------------------------|--|
| denied | The certificate server has denied the request for policy reasons. |
| granted | The CA core has generated the appropriate certificate for the certificate request. |
| initial | The request has been created by the SCEP server. |
| malformed | The certificate server has determined that the request is invalid for cryptographic reasons. |
| pending | The enrollment request must be manually accepted by the network administrator. |

Examples

The following example shows output for the certificate server "certsrv1," which has a pending certificate enrollment request:

```
Router# show crypto pki server certsrv1 requests
Enrollment Request Database:
ReqID  State      Fingerprint                                     SubjectName
-----
1      pending    0A71820219260E526D250ECC59857C2D  serialNumber=2326115A+hostname=831.
```

The following example shows the output for shadow public key infrastructure (PKI) certificate info requests:

```
Router# show crypto pki server mycs requests
Enrollment Request Database:

Subordinate CA certificate requests:
ReqID  State      Fingerprint                                     Fingerprint (unsigned)
SubjectName
-----

RA certificate requests:
ReqID  State      Fingerprint                                     Fingerprint (unsigned)
SubjectName
-----

Router certificates requests:
ReqID  State      Fingerprint                                     Fingerprint (unsigned)
SubjectName
-----
1      pending    9A0A1392A438AF02E6DD720A9890C449  2991D157A1686BEF65B075D138FEE9F9
hostname=middlerouter1

Router rollover certificates requests:
ReqID  State      Fingerprint                                     SubjectName
-----
2      pending    B69062E0E47198E5BFA426AF07FE3A4B  hostname=client
```

Related Commands

| Command | Description |
|--------------------------|---|
| crypto pki server | Enables a Cisco IOS certificate server and enters PKI configuration mode. |

show crypto pki timers

To display the status of the managed timers that are maintained by Cisco IOS for public key infrastructure (PKI), use the **show crypto pki timers** command in EXEC mode.

show crypto pki timers

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

| Release | Modification |
|-------------|---|
| 12.2(8)T | The show crypto ca timers command was introduced. |
| 12.3(7)T | This command replaced the show crypto ca timers command. |
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |

Usage Guidelines

For each timer, this command displays the time remaining before the timer expires. It also associates trustpoint certification authorities (CAs), except for certificate revocation list (CRL) timers, by displaying the CRL distribution point.

Examples

The following example is sample output for the **show crypto pki timers** command:

```
Router# show crypto pki timers
PKI Timers
| 4d15:13:33.144
| 4d15:13:33.144 CRL http://msca-root.cisco.com/CertEnroll/msca-root.crl
| 328d11:56:48.372 RENEW msroot
| 6:43.201 POLL verisign
```

Related Commands

| Command | Description |
|------------------------------|--|
| auto-enroll | Enables autoenrollment. |
| crypto pki trustpoint | Declares the CA that your router should use. |

show crypto pki timer detail

To display the absolute time stamp of the timers that are maintained by Cisco IOS for public key infrastructure (PKI) in ISO8601 format, use the **show crypto pki timer detail** command in EXEC mode.

show crypto pki timer detail

Syntax Description This command has no arguments or keywords.

Command Modes
EXEC

| Command History | Release | Modification |
|-----------------|--------------------------|------------------------------|
| | Cisco IOS XE Fuji 16.9.1 | This command was introduced. |

Examples

The following example is sample output for the **show crypto pki timer detail** command:

```
Router # show crypto pki timer detail
PKI Timers
|      1:44.647 (2018-06-03T07:09:19Z)
|      1:44.647 (2018-06-03T07:09:19Z) SHADOW test
|      11:11.420 (2018-06-03T07:18:46Z) SESSION CLEANUP
Expiry Alert Timers
|303d23:57:20.646 (2019-04-03T07:04:55Z)
|303d23:57:20.646 (2019-04-03T07:04:55Z) ID(test)
|303d23:57:21.325 (2019-04-03T07:04:56Z) CS(test)
Trustpool Timers
|3693d22:22:24.339 (2028-07-14T05:29:59Z)
|3693d22:22:24.339 (2028-07-14T05:29:59Z) TRUSTPOOL
CS Timers
|      5:57:21.277 (2018-06-03T13:04:56Z)
|      5:57:21.277 (2018-06-03T13:04:56Z) CS CRL UPDATE
|363d23:57:20.995 (2019-06-02T07:04:55Z) CS CERT EXPIRE
```


show crypto pki token

To display the Cisco IOS public key infrastructure (PKI) tokens that are configured on the router, use the **show crypto pki token** command in privileged EXEC mode.

```
show crypto pki token [name]
```

Syntax Description

| | |
|-------------|---|
| <i>name</i> | (Optional) Specifies the name of the token. |
|-------------|---|

Command Default

If the *name* argument is not specified, command output is displayed for all PKI tokens.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.4(15)T | This command was introduced. |

Examples

The following is sample output from the **show crypto pki token** command:

```
Router# show crypto pki token
Configuration for token usbtoken0:
Automatic login enabled.
Removal timeout 60 seconds
Configuration for token default:
Secondary Config file "BIFT.CFG"
```

The table below describes the significant fields shown in the display.

Table 48: show crypto pki token Field Descriptions

| Field | Description |
|----------------------------|--|
| Automatic login enabled | Indicates that the crypto PKI token is configured to log in automatically. |
| Removal timeout 60 seconds | Indicates that the router waits for 60 seconds before removing the Rivest, Shamir, and Adelman (RSA) keys that are stored in the eToken. |
| Secondary Config file | Indicates that the specified file will be merged with the running configuration after the eToken is logged into the router. |

Related Commands

| Command | Description |
|-----------------------------------|--|
| crypto pki token removal timeout | Sets the time interval that the router waits before removing the RSA keys that are stored in the eToken. |
| crypto pki token secondary config | Merges a specified file with the running configuration after the eToken is logged into the router. |

show crypto pki trustpoints

To display the trustpoints that are configured in the router, use the **show crypto pki trustpoints** command in privileged EXEC or user EXEC mode.

show crypto pki trustpoints [{*status* | *label* [*status*]}]

Syntax Description

| | |
|---------------|-------------------------------|
| status | (Optional) Trustpoint status. |
| label | (Optional) Trustpoint name. |

Command Default

If the *label* argument (trustpoint name) is not specified, command output is displayed for all trustpoints.

Command Modes

Privileged EXEC (#)
User EXEC (>)

Command History

| Release | Modification |
|-------------|--|
| 12.2(8)T | The show crypto ca trustpoints command was introduced. |
| 12.3(7)T | This command replaced the show crypto ca trustpoints command. |
| 12.3(11)T | The status keyword and <i>label</i> argument were added. |
| 12.3(14)T | The command output was modified to include persistent self-signed certificate parameters. |
| 12.4(2)T | The command output was modified to include shadow, or rollover, public key infrastructure (PKI) certificate availability and Simple Certificate Enrollment Protocol (SCEP) capabilities. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(22)T | The command output was modified to include X.509 certificate IP address extension information. |

Examples

The following is sample output from the **show crypto pki trustpoints** command:

```
Router# show crypto pki trustpoints
Trustpoint bo:
  Subject Name:
    CN = host Certificate Manager
    O = company.com
    C = US
    Serial Number:01
  Certificate configured.
  CEP URL:http://host
  CRL query url:ldap://host
```

The following is sample output from the **show crypto pki trustpoints** command when a persistent self-signed certificate has been configured:

```
Router# show crypto pki trustpoints
Trustpoint local:
  Subject Name:
    serialNumber=C63EBBE9+ipaddress=10.3.0.18+hostname=test.company.com
    Serial Number: 01
  Persistent self-signed certificate trust point
```

The following output shows that a shadow PKI certificate is available and shows the SCEP capabilities:

```
Router# show crypto pki trustpoints
Trustpoint vpn:
  Subject Name:
    cn=Company SSL CA
    o=Company
  Serial Number: 0FFEBC1B6F6D9D0EA7875875E4C695
  Certificate configured.
  Rollover certificate configured.
  Enrollment Protocol:
    SCEPv1, PKI Rollover
```

The following output using the **status** keyword shows that the trustpoint is configured in query mode and is currently trying to query the certificates (the certificate authority (CA) certificate and the router certificate are both pending):

```
Router# show crypto pki trustpoints status
Trustpoint yni:
  Issuing CA certificate pending:
    Subject Name:
      cn=r1 Cert Manager,ou=pki,o=company.com,c=country
    Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
  Router certificate pending:
    Subject Name:
      hostname=host.company.com,o=company.com
  Next query attempt:
    52 seconds
```

The following output using the **status** keyword shows that the trustpoint has been authenticated:

```
Router# show crypto pki trustpoints status
Trustpoint yni:
  Issuing CA certificate configured:
    Subject Name:
      cn=r1 Cert Manager,ou=pki,o=company.com,c=country
    Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
  State:
    Keys generated ..... No
    Issuing CA authenticated ..... Yes
    Certificate request(s) ..... None
```

The following output using the **status** keyword shows that the trustpoint is enrolling and that two of the certificate requests are pending (Signature and Encryption):

```
Router# show crypto pki trustpoints status
Trustpoint yni:
  Issuing CA certificate configured:
    Subject Name:
      cn=r1 Cert Manager,ou=pki,o=company.com,c=country
```

```

Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
Router Signature certificate pending:
  Requested Subject Name:
    hostname=host.company.com
  Request Fingerprint: FAE0D74E BB844EA1 54B26698 56AB42EC
  Enrollment polling: 1 times (9 left)
  Next poll: 32 seconds
Router Encryption certificate pending:
  Requested Subject Name:
    hostname=host.company.com
  Request Fingerprint: F4E815DB D9D9B60F 9B5B1724 3E155DBF
  Enrollment polling: 1 times (9 left)
  Next poll: 44 seconds
Last enrollment status: Pending
State:
  Keys generated ..... Yes (Signature, Encryption)
  Issuing CA authenticated ..... Yes
  Certificate request(s) ..... Pending

```

The following output using the **status** keyword shows that enrollment has succeeded and that two router certificates have been granted (Signature and Encryption):

```

Router# show crypto pki trustpoints status

Trustpoint yni:
  Issuing CA certificate configured:
    Subject Name:
      cn=rl Cert Manager,ou=pki,o=company.com,c=country
    Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
  Router Signature certificate configured:
    Subject Name:
      hostname=host.company.com,o=company.com
    Fingerprint: 8A370B8B 3B6A2464 F962178E 8385E9D6
  Router Encryption certificate configured:
    Subject Name:
      hostname=host.company.com,o=company.com
    Fingerprint: 43A03218 C0AFF844 AE0C162A 690B414A
  Last enrollment status: Granted
  State:
    Keys generated ..... Yes (Signature, Encryption)
    Issuing CA authenticated ..... Yes
    Certificate request(s) ..... Yes

```

The following output using the **status** keyword shows that trustpoint enrollment has been rejected:

```

Router# show crypto pki trustpoints status

Trustpoint yni:
  Issuing CA certificate configured:
    Subject Name:
      cn=rl Cert Manager,ou=pki,o=company.com,c=country
    Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
  Last enrollment status: Rejected
  State:
    Keys generated ..... Yes (General Purpose)
    Issuing CA authenticated ..... Yes
    Certificate request(s) ..... None

```

The following output using the **status** keyword shows that enrollment has succeeded and that the router is configured for autoenrollment using a regenerated key. In addition, the running configuration has been modified so that it will not be saved automatically after autoenrollment.

```

Router# show crypto pki trustpoints status

```

```
Trustpoint yni:
  Issuing CA certificate configured:
    Subject Name:
      cn=r1 Cert Manager,ou=pki,o=company.com,c=country
    Fingerprint: C21514AC 12815946 09F635ED FBB6CF31
  Router General Purpose certificate configured:
    Subject Name:
      hostname=host.company.com,o=company.com
    Fingerprint: FC365F95 E24D4B55 81347510 10FFE331
  Last enrollment status: Granted
  Next enrollment attempt:
    01:58:25 PST Feb 14 2004
    * A new key will be generated *
    * Configuration will not be saved after enrollment *
  State:
    Keys generated ..... Yes (General Purpose)
    Issuing CA authenticated ..... Yes
    Certificate request(s) ..... Yes
```

The following output displays SIGNED PKCS10 fingerprint irrespective of being enrolled through a CA server or a RA server. Additionally, it displays SIGNED PKCS10 SHA2 fingerprint along with SHA1 SIGNED PKCS10 fingerprint, and MD5 SIGNED PKCS10 fingerprint.

```
Router# show crypto pki trustpoints test status
Trustpoint test:
  Issuing CA certificate configured:
    Subject Name:
      cn=ca
    Fingerprint MD5: F6345AE9 3A554053 5F009F1A 4DD8F572
    Fingerprint SHA1: 2E46DB45 03B2968A FB0B79B0 56C8E106 DB12529A
  Router General Purpose certificate pending:
  Requested Subject Name:
    hostname=Router,cn=test
  Request Fingerprint MD5: CD76F722 60617951 DE5AF18D 3FC74A2A
  Request Fingerprint SHA1: 10A04557 9B5613B2 D0DD8AA5 72B0601B 05940E3D
  Request Fingerprint SHA2: 3E96A4CE 9824A2D4 07344A63 3D5EF642 7C53ADD0 B0C7B521 61DA06D8
  289FA221
  Request Fingerprint MD5 (unsigned): D68D4DF6 84A58B40 76EBD026 40CE42B3
  Enrollment polling: 0 times (999 left)
  Next poll: 38 seconds
  Last enrollment status: Pending
  State:
    Keys generated ..... Yes (General Purpose, non-exportable)
    Issuing CA authenticated ..... Yes
    Certificate request(s) ..... Pending
```

The table below describes the significant fields shown in the display.

Table 49: show crypto pki trustpoints Field Descriptions

| Field | Description |
|---|---|
| Trustpoint | Name of the trustpoint. |
| Issuing CA certificate pending | The CA certificate is being retrieved (query mode). |
| Issuing CA certificate [not] configured | A CA certificate is [not] configured. |
| Subject Name | Subject name of the indicated certificate. |
| Next query attempt | Time until the next query attempt (query mode). |

| Field | Description |
|---|---|
| Router certificate pending/Router [key usage] certificate pending | The trustpoint is attempting to obtain the certificate from the CA server (through query mode or enrollment). |
| Router [key usage] certificate configured | Certificate of the specified key usage is configured. |
| Requested Subject Name | Subject name used in the enrollment request (Public Key Cryptography Standards 10 [PKCS10]). |
| Fingerprint MD5/SHA1 | Fingerprint of the indicated certificate (Message Digest 5 [MD5] or Secure Hash Algorithm 1 [SHA]1). |
| Request Fingerprint MD5/SHA1 | Fingerprint of the PKCS10 enrollment request (MD5/SHA1). |
| Enrollment polling: [polled] times ([remaining] left)/Next poll: in seconds | Number of SCEP polling attempts that have been made and that remain before the router gives up/Time until the next polling attempt. |
| Last enrollment status: Pending/Granted/Rejected/Failed | Last enrollment attempt status (pending, granted, rejected, or failed). |
| Next enrollment attempt: <i>time</i> (Optional) A new key will be generated. (Optional) Configuration will not be saved after enrollment. | The trustpoint is configured autoenrollment and the autoenrollment will happen at <i>time</i> . (Optional) The trustpoint is configured to generate a new key when autoenrollment occurs. (Optional) The running configuration is "dirty," so the configuration will not be saved automatically after autoenrollment. |
| State | Current state of the trustpoint. |
| Keys generated | "Yes or No" and the key usage (General Purpose or Signature, Encryption). |
| Issuing CA authenticated | "Yes or No" if crypto CA authentication has been done successfully. |
| Certificate request(s) | Progress of current enrollment: "Pending," "Yes," (complete), or "None" (not in progress). |

Related Commands

| Command | Description |
|------------------------------|--|
| crypto pki trustpoint | Declares the CA that your router should use. |

show crypto pki trustpool

To display the public key infrastructure (PKI) trustpool certificates of the router, use the **show crypto pki trustpool** command in privileged EXEC or user EXEC mode.

show crypto pki trustpool [policy]

Syntax Description

| | |
|---------------|---|
| policy | (Optional) Displays the PKI trustpool policy. |
|---------------|---|

Command Modes

User EXEC (>) and Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|---|
| 15.2(2)T | This command was introduced. |
| 15.1(1)SY | This command was integrated into Cisco IOS 15.1(1)SY. |

Usage Guidelines

If the **show crypto pki trustpool** is used without the **policy** keyword, then the PKI certificates of the router are displayed in a verbose format.

If the **show crypto pki trustpool** is used with the **policy** keyword, then the PKI trustpool of the router is displayed.

Examples

The following **show crypto pki trustpool policy** command output displays the default PKI trustpool policy:

```
Router# show crypto pki trustpool policy

Chain validation will stop at the first CA certificate in the pool
Trustpool CA certificates will expire 12:58:31 PST Apr 5 2012
Trustpool policy revocation order:      crl
Certificate matching is disabled
Policy Overrides:
```

The following **show crypto pki trustpool** command output displays the certificates in PKI trustpool:



Note The command output in this example is abridged because it is verbose.

```
Router# show crypto pki trustpool

CA Certificate
Status: Available
Version: 3
Certificate Serial Number (hex): 00D01E47400000111C38A96440000002
Certificate Usage: Signature
Issuer:
  cn=DST Root CA X3
  o=Digital Signature Trust Co.
Subject:
  cn=Cisco SSCA
```

```

o=Cisco Systems
CRL Distribution Points:
  http://crl.identrust.com/DSTROOTCAX3.crl
Validity Date:
  start date: 12:58:31 PST Apr 5 2007
  end   date: 12:58:31 PST Apr 5 2012

CA Certificate
Status: Available
Version: 3
Certificate Serial Number (hex): 6A6967B3000000000003
Certificate Usage: Signature
Issuer:
  cn=Cisco Root CA 2048
  o=Cisco Systems
Subject:
  cn=Cisco Manufacturing CA
  o=Cisco Systems
CRL Distribution Points:
  http://www.cisco.com/security/pki/crl/crca2048.crl
Validity Date:
  start date: 14:16:01 PST Jun 10 2005
  end   date: 12:25:42 PST May 14 2029

```

Related Commands

| Command | Description |
|------------------------------------|--|
| cabundle url | Configures the URL from which the PKI trustpool CA bundle is downloaded. |
| chain-validation | Enables chain validation from the peer's certificate to the root CA certificate in the PKI trustpool. |
| crl | Specifies the CRL query and cache options for the PKI trustpool. |
| crypto pki trustpool import | Manually imports (downloads) the CA certificate bundle into the PKI trustpool to update or replace the existing CA bundle. |
| crypto pki trustpool policy | Configures PKI trustpool policy parameters. |
| default | Resets the value of a ca-trustpool configuration subcommand to its default. |
| match | Enables the use of certificate maps for the PKI trustpool. |
| ocsp | Specifies OCSP settings for the PKI trustpool. |

| Command | Description |
|-------------------------|--|
| revocation-check | Disables revocation checking when the PKI trustpool policy is being used. |
| show | Displays the PKI trustpool policy of the router in ca-trustpool configuration mode. |
| source interface | Specifies the source interface to be used for CRL retrieval, OCSP status, or the downloading of a CA certificate bundle for the PKI trustpool. |
| storage | Specifies a file system location where PKI trustpool certificates are stored on the router. |
| vrf | Specifies the VRF instance to be used for CRL retrieval. |

show crypto route

To display routes that are created through IPsec via Reverse Route Injection (RRI) or Easy VPN virtual tunnel interfaces (VTIs) in one table, use the **show crypto route** command in privileged EXEC mode.

show crypto route

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

Command History

| Release | Modification |
|-----------|--|
| 12.4(15)T | This command was introduced. |
| 15.1(3)S | This command was integrated into Cisco IOS Release 15.1(3)S. |

Examples

The following example displays routes that were created through IPsec using RRI and VTIs:

```
Router# show crypto route
VPN Routing Table: Shows RRI and VTI created routes
Codes: RRI - Reverse-Route, VTI- Virtual Tunnel Interface
       S - Static Map ACLs
Routes created in table GLOBAL DEFAULT
192.168.6.2/255.255.255.255 [0/0] via 10.0.0.133
                               on Virtual-Access3 RRI
10.1.1.0/255.255.255.0 [10/0] via Virtual-Access2 VTI
192.168.6.1/255.255.255.255 [0/0] via Virtual-Access2 VTI
```

The fields in the above display are self-explanatory.

Related Commands

| Command | Description |
|--------------------------|--|
| reverse-route | Creates source proxy information for a crypto map entry. |
| set reverse-route | Defines a distance metric for each static route or tags a RRI-created route. |

show crypto ruleset

To display information about crypto rules on outgoing packets, use the **show crypto ruleset** command in privileged EXEC mode.

show crypto ruleset [{**detail** | **platform**}]

| Syntax Description | detail | (Optional) Displays the directional mode of the IPsec security association (SA). |
|--------------------|----------|---|
| | platform | (Optional) Displays information about IPsec crypto rules for hardware and software platforms. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|--|
| 12.2(20)T | This command was introduced. |
| 15.2(3)T | This command was modified. The output was enhanced to display crypto rules on outgoing IPv6 packets. |
| Cisco IOS XE Release 3.7S | This command was modified. The platform keyword was added. The output was enhanced to display information about the IPsec crypto rules for hardware and software platforms. |

Usage Guidelines

The **show crypto ruleset platform** command displays the output from the following **show** commands, as listed in the order below:

- **show platform software ipsec f0 access-list all**
- **show platform hardware qfp active classification class-group-manager class-group client ipsec all**

Examples

Assuming that the key server (KS) has the following GET VPN IPv4 group access control list (ACL) policy, the example that follows the policy shows information about the crypto rules on outgoing packets:

```
ip access-list extended get-acl
deny  ospf any any
deny  ip any host 192.168.2.5
deny  ip host 192.168.2.5 any
permit ip any any

crypto gdoi group GETVPN
identity number 1111
server local
rekey authentication mypubkey rsa mykeys
rekey transport unicast
sa ipsec 1
profile GET_PROFILE
match address ipv4 get-acl
replay time window-size 10
address ipv4 192.168.2.5
```

```
Device# show crypto ruleset
```

```
Mtree:
```

```
 11 192.168.2.1/500 ANY Forward, Forward
 11 192.168.2.1/4500 ANY Forward, Forward
 11 ANY/848 ANY Forward, Forward
 11 ANY ANY/848 Forward, Forward
 59 ANY ANY DENY
IP ANY 192.168.2.5 DENY
IP 192.168.2.5 ANY DENY
IP ANY ANY Discard, Encrypt
```

The following example shows the directional mode of the IPsec SA for the above policy:

```
Device# show crypto ruleset detail
```

```
Mtree:
```

```
199 VRF 0 11 192.168.2.1/500 ANY Forward, Forward
299 VRF 0 11 192.168.2.1/4500 ANY Forward, Forward
200000199 VRF 0 11 ANY/848 ANY Forward, Forward
200000299 VRF 0 11 ANY ANY/848 Forward, Forward
1000000000000201 VRF 0 59 ANY ANY DENY -> 1000000009999900
1000000000000301 VRF 0 IP ANY 192.168.2.5 DENY -> 1000000009999900
1000000000000401 VRF 0 IP 192.168.2.5 ANY DENY -> 1000000009999900
1000000000000501 VRF 0 IP ANY ANY Discard, Encrypt
```

Assuming that KS has the following GET VPN IPv6 group ACL policy, the example that follows the policy shows information about the crypto rules on outgoing packets:

```
ipv6 access-list ACL_GETV6_ANY
 permit ipv6 any any

crypto gdoi group ipv6 GETV6
 identity number 1111
 server local
 rekey authentication mypubkey rsa GETKEY
 rekey transport unicast
 sa ipsec 1
 profile IPSEC_PROF_GETV6
 match address_ipv6 ACL_GETV6_ANY
 replay time window-size 10
 address ipv4 192.168.2.2
```

```
Device# show crypto ruleset
```

```
Mtree:
```

```
IPv6:
0/0/1/1
 17 2001:DB8::A8BB:CCFF:FE01:2C02 500 ANY Forward, Forward
0/0/2/1
 17 2001:DB8::A8BB:CCFF:FE01:2C02 4500 ANY Forward, Forward
0/2/1/1
 17 ANY 848 ANY Forward, Forward
0/2/2/1
 17 ANY ANY 848 Forward, Forward
10/0/2/0
IPV6 ANY ANY Discard, Encrypt
```

```
Mtree:
```

```
 11 192.168.2.3/500 ANY Forward, Forward
 11 192.168.2.3/4500 ANY Forward, Forward
```

```

11 ANY/848 ANY Forward, Forward
11 ANY ANY/848 Forward, Forward
01 192.168.2.3 192.168.2.4 Discard, Encrypt
01 192.168.2.4 192.168.2.3 Discard, Encrypt
    
```

The following example shows the directional mode of the IPsec SA for the above policy:

Device# **show crypto ruleset detail**

```

IPv6:
0/0/1/1
 17 2001:DB8::A8BB:CCFF:FE01:2C02 500 ANY Forward, Forward
0/0/2/1
 17 2001:DB8::A8BB:CCFF:FE01:2C02 4500 ANY Forward, Forward
0/2/1/1
 17 ANY 848 ANY Forward, Forward
0/2/2/1
 17 ANY ANY 848 Forward, Forward
10/0/2/0
IPV6 ANY ANY Discard, Encrypt
Mtree:
199 VRF 0 11 192.168.2.3/500 ANY Forward, Forward
299 VRF 0 11 192.168.2.3/4500 ANY Forward, Forward
200000199 VRF 0 11 ANY/848 ANY Forward, Forward
200000299 VRF 0 11 ANY ANY/848 Forward, Forward
1000000000000201 VRF 0 01 192.168.2.3 192.168.2.4 Discard, Encrypt
1000000000000301 VRF 0 01 192.168.2.4 192.168.2.3 Discard, Encrypt
    
```

The following table describes the significant fields shown in the displays.

Table 50: show crypto ruleset Field Descriptions

| Field | Description |
|-----------------------------|---|
| 59 ANY ANY DENY | <ul style="list-style-type: none"> • 59—Hexadecimal value of the Open Shortest Path First (OSPF) protocol. • First ANY—Any source IP address. • Second ANY—Any destination IP address. • DENY packets matching this rule will not be encrypted. |
| 11 ANY/848 ANY/848 DENY | <ul style="list-style-type: none"> • 11—Hexadecimal value of the UDP. • First ANY/848—Any source IP address that has a source port 848. • Second ANY/848—Any destination IP address having a destination port 848. • DENY—Packets matching this rule will not be encrypted. |
| IP ANY ANY IPsec SA Passive | <ul style="list-style-type: none"> • Policy of “IP packets with any source or destination address or port” is in IPsec security association (SA) passive mode—Receives clear and encrypted packets; sends only encrypted packets. |

| Field | Description |
|---|---|
| IP ANY ANY IPsec Cryptomap | <ul style="list-style-type: none">• Policy of “IP packets with any source or destination address or port” is created by an IPsec crypto map—Receives or sends only encrypted packets. |
| 20000001000019 59 ANY ANY DENY -> 20000001999999 | <ul style="list-style-type: none">• The first number is the priority number of the policy or rule.• The second number is the deny priority number of the policy or rule. <p>Note These numbers are internal data values and are generally used by developers.</p> |

show crypto session

To display status information for active crypto sessions, use the **show crypto session** command in privileged EXEC mode.

```
show crypto session [{groups | interface type [{brief | detail}] | isakmp [{group group-name | profile profile-name}] [{brief | detail}] | [{local | remote}] [{ip-address ipv6-address}] [port port-number] | [fvrf fvrf-name] [ivrf ivrf-name] [{brief | detail}] | summary group-name | username username}]
```

IPsec and IKE Stateful Failover Syntax

```
show crypto session [{active | standby}]
```

| Syntax Description | |
|------------------------------------|--|
| groups | (Optional) Displays crypto session group usage for all groups. |
| interface type | (Optional) Displays crypto sessions on the connected interface. <ul style="list-style-type: none"> The <i>type</i> value is the type of interface connection. |
| brief | (Optional) Provides brief information about the session, such as the peer IP address, interface, username, group name or phase 1 ID, length of session uptime, and current session status (up/down). |
| detail | (Optional) Provides detailed information about the session, such as the capability of the Internet Key Exchange (IKE) security association (SA), connection ID, remaining lifetime of the IKE SA, inbound or outbound encrypted or decrypted packet number of the IP security (IPsec) flow, dropped packet number, and kilobyte-per-second lifetime of the IPsec SA. |
| isakmp group group-name | (Optional) Displays crypto sessions using the Internet Security Association and Key Management Protocol (ISAKMP) group. <ul style="list-style-type: none"> The <i>group-name</i> value is the name of the group. |
| isakmp profile profile-name | (Optional) Displays crypto sessions using the ISAKMP profile. <ul style="list-style-type: none"> The <i>profile-name</i> value is the name of the profile. |
| local | (Optional) Displays status information about crypto sessions of a local crypto endpoint. |
| remote | (Optional) Displays status information about crypto sessions of a remote session. |
| ip-address | IP address of the local or remote crypto endpoint. |
| ipv6-address | IPv6 address of the local or remote crypto endpoint. |
| port port-number | (Optional) Displays status information about the port of the local crypto endpoint. <ul style="list-style-type: none"> The <i>port-number</i> value can be from 1 to 65535. The default value is 500. |

| | |
|---|---|
| fvr <i>fvr</i> - <i>name</i> | (Optional) Displays status information about the front door virtual routing and forwarding (fVRF) session. <ul style="list-style-type: none"> The <i>fvr</i>-<i>name</i> value is the name of the fVRF session. |
| ivr <i>ivr</i> - <i>name</i> | (Optional) Displays status information about the inside VRF (iVRF) session. <ul style="list-style-type: none"> The <i>ivr</i>-<i>name</i> value is the name of the iVRF session. <p>Note The iVRF session can have an empty value when VRF-aware IPsec (fVRF and iVRF) uses IPsec protected tunnels sharing the same tunnel source and the same IPsec profile. This scenario is valid for the following conditions:</p> <ul style="list-style-type: none"> IPsec protected multipoint generic routing encapsulation (mGRE) IPsec protected Point-to-Point GRE tunnels |
| summary <i>group</i> - <i>name</i> | (Optional) Displays a list of crypto session groups and associated group members. |
| username <i>username</i> | (Optional) Displays the crypto session for the specified extended authentication (XAUTH), public key infrastructure (PKI), or authentication, authorization, and accounting (AAA) username. |
| active | (Optional) Displays all crypto sessions in the active state. |
| standby | (Optional) Displays all crypto sessions that are in the standby state. |

Command Default

When no optional keywords and arguments are specified, all existing sessions are displayed.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|---|
| 12.3(4)T | This command was introduced. |
| 12.2(18)SXD | This command was integrated into Cisco IOS Release 12.2(18)SXD. |
| 12.3(11)T | This command was modified. The active and standby keywords were added. |
| 12.4(4)T | This command was modified. IPv6 address information was added to the command output. |
| 12.2(33)SRA | This command was integrated into Cisco IOS release 12.(33)SRA. |
| 12.4(11)T | This command was modified. The brief , groups , interface <i>interface-type</i> , isakmp group <i>group-name</i> , isakmp profile <i>profile-name</i> , summary , and username <i>username</i> keywords and arguments were added. The show crypto session output was updated to include the username, ISAKMP profile, ISAKMP group, assigned address, and session uptime. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

This command lists all the active VPN sessions and the IKE and IPsec SAs for each VPN session. The listing includes the following information:

- Interface.
- IKE peer description, if available.
- IKE SAs that are associated with the peer by which the IPsec SAs are created.
- IPsec SAs serving the flows of a session.

Multiple IKE or IPsec SAs may be established for the same peer (for the same session). In such a case, IKE peer descriptions are repeated with different values for the IKE SAs associated with the peer and for the IPsec SAs serving the flows of the session.

IPv6 does not support the **fvrf** and **ivrf** keywords and the *vrf-name* argument.



Note The Session status field displays UP-NO-IKE and IP-IDLE value when different Inside VRFs (IVRFs) are configured for different shared protection tunnels in a DMVPN configuration. This is because the interface-VRF field is not known until the IPsec SAs are established and debugging filters based on IVRF will not work. Secondly, the **tunnel protection shared** command will not display the correct VRF since shared tunnel is not established with the interface-VRF.

Examples

The following example shows the status information for all active crypto sessions:

```
Device# show crypto session

Crypto session current status
Interface: Virtual-Access2
Username: cisco
Profile: prof
Group: easy
Assigned address: 10.3.3.4
Session status: UP-ACTIVE
Peer: 10.1.1.2 port 500
  IKE SA: local 10.1.1.1/500 remote 10.1.1.2/500 Active
  IKE SA: local 10.1.1.1/500 remote 10.1.1.2/500 Inactive
  IPSEC FLOW: permit ip 0.0.0.0/0.0.0.0 host 3.3.3.4
    Active SAs: 2, origin: crypto map
```

The following example shows the **show crypto session brief** command output:

```
Device# show crypto session brief

Status: A- Active, U - Up, D - Down, I - Idle, S - Standby, N - Negotiating
        K - No IKE
ivrf = (none)
      Peer      I/F      Username      Group/Phase1_id  Uptime      Status
      10.1.1.2  Vi2      cisco         easy              00:50:30    UA
```

The following example shows the **show crypto session detail** command output:

```
Device# show crypto session detail

Crypto session current status
Code: C - IKE Configuration mode, D - Dead Peer Detection
```

```

K - Keepalives, N - NAT-traversal, X - IKE Extended Authentication
Interface: Virtual-Access2
Username: cisco
Profile: prof
Group: easy
Assigned address: 10.3.3.4
Uptime: 00:49:33
Session status: UP-ACTIVE
Peer: 10.1.1.2 port 500 fvrf: (none) ivrf: (none)
Phase1_id: easy
Desc: (none)
IKE SA: local 10.1.1.1/500 remote 10.1.1.2/500 Active
Capabilities: CX connid:1002 lifetime:23:10:15
IPSEC FLOW: permit ip 10.0.0.0/0.0.0.0 host 10.3.3.4
Active SAs: 2, origin: crypto map
Inbound: #pkts dec'ed 0 drop 0 life (KB/Sec) 4425776/626
Outbound: #pkts enc'ed 0 drop 0 life (KB/Sec) 4425776/626

```

The following table describes the significant fields shown in the display.

Table 51: show crypto session Field Descriptions

| Field | Description |
|----------------|--|
| Interface | Interface to which the crypto session is related. |
| Session status | Current status of the crypto (VPN) sessions. See the table below for explanations of the status of the IKE SA, IPsec SA, and tunnel as shown in the display. |
| IKE SA | Information is provided about the IKE SA, such as the local and remote address and port, SA status, SA capabilities, crypto engine connection ID, and remaining lifetime of the IKE SA. |
| IPSEC FLOW | A snapshot of information about the IPsec-protected traffic flow, such as the status of the flow (for example, permit IP host 10.1.1.5 host 10.1.2.5), the number of IPsec SAs, the origin of the SA, such as manually entered, dynamic, or static crypto map, number of encrypted or decrypted packets or dropped packets, and the IPsec SA remaining lifetime in kilobytes per second. |

The following table provides an explanation of the current status of the VPN sessions shown in the display.

Table 52: Current Status of the VPN Sessions

| IKE SA | IPsec SA | Tunnel Status | Description |
|---------------|---------------------|---------------|--|
| Exist, active | Exist (flow exists) | UP-ACTIVE | Both IPsec and IKE Phase1 SAs exist and are active. |
| Exist, active | None (flow exists) | UP-IDLE | IKE Phase1 SAs exist, and IPsec SAs are not present. |
| Exist, active | None (no flow) | UP-IDLE | |

| IKE SA | IPsec SA | Tunnel Status | Description |
|-----------------|---------------------|------------------|--|
| Exist, inactive | Exist (flow exists) | UP-NO-IKE | IPsec SAs exist, and either IKE Phase1 SAs are not present in the IKE Phase1 database for this peer or IKE Phase1 SAs are inactive. Note IKE Phase1 SAs being inactive or not being ready can be because IKE Phase1 is still negotiating or because IKE Phase1 SA is marked to be deleted. |
| None | Exist (flow exists) | UP-NO-IKE | |
| Exist, inactive | None (flow exists) | DOWN-NEGOTIATING | IPsec SAs are not present, and IKE Phase1 SAs are either inactive or do not exist. |
| Exist, inactive | None (no flow) | DOWN-NEGOTIATING | |
| None | None (flow exists) | DOWN | Both IPsec and IKE Phase1 SAs are not present. |
| None | None (no flow) | DOWN | |



Note IPsec flow may not exist if a dynamic crypto map is being used.



Note The UP-NO-IKE tunnel status in the **show crypto session** command output does not indicate a failure in the following scenario.

Scenario: VRF-aware IPsec (fVRF and iVRF) using IPsec protected tunnels sharing the same tunnel source and the same IPsec profile. This scenario is valid for the following conditions:

- IPsec protected mGRE.
- IPsec protected p2p GRE tunnels.

For more specific IKE-related status information, see either the **show crypto isakmp sa** or the **show crypto isakmp sa detail** command outputs.

The following example shows the status information for all crypto sessions in the standby state:

```
Router# show crypto session standby

Crypto session current status
Interface: Ethernet0/0
Session status: UP-STANDBY
Peer: 10.165.200.225 port 500
  IKE SA: local 10.165.201.3/500 remote 10.165.200.225/500 Active
  IKE SA: local 10.165.201.3/500 remote 10.165.200.225/500 Active
  IPSEC FLOW: permit ip host 192.168.0.1 host 172.16.0.1
    Active SAs: 4, origin: crypto map
```

Related Commands

| Command | Description |
|--------------------------------|---|
| clear crypto session | Deletes crypto sessions (IPsec and ISAKMP SAs). |
| description | Adds a description for an IKE peer. |
| show crypto isakmp peer | Displays peer descriptions. |

show crypto session group

To display groups that are currently active on the Virtual Private Network (VPN) device, use the **show crypto session group** command in privileged EXEC mode.

show crypto session group

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 12.3(4)T | This command was introduced. |
| | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| | 12.2SX | This command is supported in the Cisco IOS 12.2SX family of releases. Support in a specific 12.2SX release is dependent on your feature set, platform, and platform hardware. |

Usage Guidelines If the **crypto isakmp client configuration group** command and **max-users** keyword have not been enabled in any VPN group profile, this command will yield a blank result.

Examples The following example shows that at least one session is active for the group Connections:

```
Router# show crypto session group
Group: Connections
cisco: 1
```

| Related Commands | Command | Description |
|------------------|--|--|
| | crypto isakmp client configuration group | Specifies to which group a policy profile will be defined. |
| | show crypto session summary | Displays groups that are currently active on the VPN device and the users that are connected for each of those groups. |

show crypto session summary

To display groups that are currently active on the Virtual Private Network (VPN) device and the users that are connected for each of those groups, use the **show crypto session summary** command in privileged EXEC mode.

show crypto session summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 12.3(4)T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS 12.2SX family of releases. Support in a specific 12.2SX release is dependent on your feature set, platform, and platform hardware. |

Usage Guidelines

If the **crypto isakmp client configuration group** command and **max-users** keyword are not enabled in any VPN group profile and the **crypto isakmp client configuration group** command and **max-logins** keyword are not enabled, this command will yield a blank result.

Examples

The following example shows that the group "cisco" is active and that it has one user connected, green, who is connected one time. The number in parentheses (1) is the number of simultaneous logins for that user.

```
Router# show crypto session summary
Group cisco has 1 connections
  User (Logins)
  green (1)
```

Related Commands

| Command | Description |
|--|--|
| crypto isakmp client configuration group | Specifies to which group a policy profile will be defined. |
| show crypto session group | Displays groups that are currently active on the VPN device. |

show crypto socket

To list crypto sockets and their state, use the **show crypto socket** command in privileged EXEC mode.

show crypto socket

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|--|
| 12.2(11)T | This command was introduced. |
| 12.2(18)SXE | This command was integrated into Cisco IOS Release 12.2(18)SXE. |
| 12.4(5) | This command was modified. The Flags field was added to command output. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.(33)SRA. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1 and implemented on the Cisco ASR 1000 Series Aggregation Services Routers. |

Examples

The following is sample output from the **show crypto socket** command:

```
Device# show crypto socket

Number of Crypto Socket connections 2
  Tu0 Peers (local/remote): 192.168.2.2/192.168.1.1
      Local Ident (addr/mask/port/prot): (192.168.2.2/255.255.255.255/0/47)
      Remote Ident (addr/mask/port/prot): (192.168.1.1/255.255.255.255/0/47)
      IPsec Profile: "dmvpn-profile"
      Flags: shared
      Socket State: Open
      Client: "TUNNEL SEC" (Client State: Active)
  Tu1 Peers (local/remote): 192.168.2.2/192.168.1.3
      Local Ident (addr/mask/port/prot): (192.168.2.2/255.255.255.255/0/47)
      Remote Ident (addr/mask/port/prot): (192.168.1.3/255.255.255.255/0/47)
      IPsec Profile: "default"
      Flags: shared
      Socket State: Open
      Client: "TUNNEL SEC" (Client State: Active)
Crypto Sockets in Listen state:
Client: "TUNNEL SEC" Profile: "dmvpn-profile" Map-name: "dmvpn-profile-head-2"
Client: "TUNNEL SEC" Profile: "default" Map-name: "Tunnel0-head-0"
```

The following table describes the significant fields shown in the display.

Table 53: show crypto socket Field Descriptions

| Field | Description |
|-------------------------------------|---|
| Number of Crypto Socket connections | Number of crypto sockets in the system. |

| Field | Description |
|--------------------------------|---|
| Flags | If this field displays “shared,” the socket is shared with more than one tunnel interface. |
| Socket State | This state can be Open, which means that active IPsec security associations (SAs) exist, or it can be Closed, which means that no active IPsec SAs exist. |
| Client | Application name and its state. |
| Crypto Sockets in Listen state | Names of the crypto IPsec profiles. For each tunnel interface, one listener socket is displayed. |

show crypto tech-support

To display the crypto technical support information, use the `show crypto tech-support` command in privileged EXEC mode.

show crypto tech-support [{peer ip-address | vrf vrf-name}]

| Syntax Description | peer | (Optional) Displays the crypto technical support information related to a peer. |
|--------------------|------------|--|
| | ip-address | (Optional) The peer IPv4 address. |
| | vrf | (Optional) Displays the crypto technical support information related to VPN routing or forwarding (VRF). |
| | vrf-name | (Optional) The VRF name. |

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-----------|------------------------------|
| 12.4(22)T | This command was introduced. |

Usage Guidelines

Use the optional keywords and arguments to display the specific crypto technical support information.

Examples

The following is sample output from the **show crypto tech-support** command. The fields are self-explanatory.

```
Router# show crypto tech-support
----- show crypto session remote 1.0.1.2 detail -----
----- show crypto ipsec sa peer 1.0.1.2 detail -----
----- show crypto isakmp sa peer 1.0.1.2 detail -----
IPv4 Crypto ISAKMP SA
dst          src          state          conn-id status
----- show crypto isakmp peers 1.0.1.2 -----
----- show crypto ruleset detail -----
----- show processes memory | include Crypto IKMP -----
240 0 7112 252 20064 0 0 Crypto IKMP
----- show processes cpu | include Crypto IKMP -----
240 0 3 0 0.00% 0.00% 0.00% 0 Crypto IKMP
----- show crypto eli -----
Hardware Encryption : ACTIVE
Number of hardware crypto engines = 1
CryptoEngine Onboard VPN details: state = Active
Capability : IPPCP, DES, 3DES, AES, IPv6, FAILCLOSE
IPSec-Session : 0 active, 1400 max, 0 failed

----- show cry engine accelerator statistic -----
Device: Onboard VPN
Location: Onboard: 0
:Statistics for encryption device since the last clear
of counters 1818819 seconds ago
0 packets in 0 packets out
```

```
0 bytes in
0 paks/sec in
0 Kbits/sec in
0 packets decrypted
0 bytes before decrypt
0 bytes decrypted
0 packets decompressed
0 bytes before decomp
0 bytes after decomp
0 packets bypass decomp
0 bytes bypass decompress
0 packets not decompress
0 bytes not decompressed
1.0:1 compression ratio
Last 5 minutes:
0 packets in

0 bytes out
0 paks/sec out
0 Kbits/sec out
0 packets encrypte
0 bytes encrypted
0 bytes after encr
0 packets compress
0 bytes before com
0 bytes after comp
0 packets bypass cs
0 bytes bypass comi
0 packets not compd
0 bytes not compre
1.0:1 overall
0 packets out
```

show crypto vlan

To display the VPN running state for an IPsec VPN SPA, use the **show crypto vlan** command in privileged EXEC mode.

show crypto vlan

Command Default No default behavior or values.

Command Modes Privileged EXEC

| Command History | Release | Modification |
|-----------------|--------------|---|
| | 12.2(18)SXE2 | This command was introduced. |
| | 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

Usage Guidelines When you **show** the configuration, the crypto engine subslot configuration state is expressed in the context of the associated interface VLAN. The interface VLAN is also shown as having been added to the appropriate inside trunk port. This is the case even if the configuration was loaded from a legacy (pre-crypto engine subslot) configuration file, or if VLANs were manually added instead of being added through the **crypto engine subslot** command.

Examples

In the following example, the interface VLAN belongs to the IPsec VPN SPA inside port:

```
Router# show crypto vlan
  Interface VLAN 2 on IPsec Service Module port 7/1/1 connected to Fa8/3
```

In the following example, VLAN 2 is the interface VLAN and VLAN 2022 is the hidden VLAN:

```
Router# show crypto vlan
Interface VLAN 2 on IPsec Service Module port 3/1/1 connected to VLAN 2022 with crypto map
set coral2
```

In the following example, either the interface VLAN is missing on the IPsec VPN SPA inside port, the IPsec VPN SPA is removed from the chassis, or the IPsec VPN SPA was moved to a different subslot:

```
Router# show crypto vlan
  Interface VLAN 2 connected to VLAN 3 (no IPsec Service Module attached)
```

Related Commands

| Command | Description |
|------------------------------|--|
| crypto connect vlan | Creates an interface VLAN for an IPsec VPN SPA and enters crypto-connect mode. |
| crypto engine subslot | Assigns an interface VLAN that requires encryption to the IPsec VPN SPA. |

show cts credentials

To display the Cisco TrustSec (CTS) device ID, use the **show cts credentials** command in EXEC or privileged EXEC mode.

show cts credentials

Syntax Description

This command has no commands or keywords.

Command Modes

Privileged EXEC (#) User EXEC (>)

Command History

| Release | Modification |
|-------------|---|
| 12.2(33)SXI | This command was introduced on the Catalyst 6500 series switches. |
| 15.2(2)T | This command was integrated into Cisco IOS Release 15.2(2)T. |

Examples

```
Router# show cts credentials
```

```
CTS password is defined in keystore, device-id = r4
```

Related Commands

| Command | Description |
|------------------------|---|
| cts credentials | Specifies the TrustSec ID and password. |

show cts interface

To display Cisco TrustSec (CTS) configuration statistics for an interface(s), use the **show cts interface** command in EXEC or privileged EXEC mode.

show cts interface [{GigabitEthernet *port* | Vlan *number* | **brief** | **summary**}]

| Syntax Description | |
|--------------------|---|
| <i>port</i> | (Optional) Gigabit Ethernet interface number. A verbose status output for this interface is returned. |
| <i>number</i> | (Optional) VLAN interface number from 1 to 4095. |
| brief | (Optional) Displays abbreviated status for all CTS interfaces. |
| summary | (Optional) Displays a tabular summary of all CTS interfaces with 4 or 5 key status fields for each interface. |

Command Default None

Command Modes
EXEC (>)
Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|---------------------------|---|
| | 12.2(33)SXI | This command was introduced on the Catalyst 6500 series switches. |
| | Cisco IOS XE Release 3.4S | This command was integrated into Cisco IOS XE Release 3.4S. |
| | 15.1(3)S | This command was integrated into Cisco IOS Release 15.1(3)S. |

Usage Guidelines Use the **show cts interface** command without keywords to display verbose status for all CTS interfaces.

Examples The following example displays output without using a keyword (verbose status for all CTS interfaces):

```
Device# show cts interface

Global Dot1x feature is Disabled
Interface GigabitEthernet0/1/0:
  CTS is enabled, mode:      MANUAL
  IFC state:                 OPEN
  Interface Active for 00:00:18.232
  Authentication Status:    NOT APPLICABLE
  Peer identity:             "unknown"
  Peer's advertised capabilities: ""
  Authorization Status:     NOT APPLICABLE
  SAP Status:                NOT APPLICABLE
  Configured pairwise ciphers:
    gcm-encrypt
    null

  Replay protection:        enabled
```

```

Replay protection mode: STRICT

Selected cipher:

Propagate SGT:          Enabled
Cache Info:
  Cache applied to link : NONE

Statistics:
  authc success:        0
  authc reject:         0
  authc failure:        0
  authc no response:    0
  authc logoff:         0
  sap success:          0
  sap fail:             0
  authz success:        0
  authz fail:           0
  port auth fail:      0
  Ingress:
    control frame bypassed: 0
    sap frame bypassed:    0
    esp packets:           0
    unknown sa:            0
    invalid sa:            0
    inverse binding failed: 0
    auth failed:           0
    replay error:          0
  Egress:
    control frame bypassed: 0
    esp packets:           0
    sgt filtered:          0
    sap frame bypassed:    0
    unknown sa dropped:    0
    unknown sa bypassed:  0

```

The following example displays output using the **brief** keyword:

```

Device# show cts interface brief

Global Dot1x feature is Disabled
Interface GigabitEthernet0/1/0:
  CTS is enabled, mode:    MANUAL
  IFC state:              OPEN
  Interface Active for 00:00:40.386
  Authentication Status:  NOT APPLICABLE
    Peer identity:        "unknown"
    Peer's advertised capabilities: ""
  Authorization Status:   NOT APPLICABLE
  SAP Status:             NOT APPLICABLE
  Propagate SGT:          Enabled
  Cache Info:
    Cache applied to link : NONE

```

Related Commands

| Command | Description |
|-----------------------|-------------------------------------|
| cts manual | Enables an interface for CTS. |
| cts sxp enable | Configures SXP on a network device. |

| Command | Description |
|----------------------|--|
| propagate sgt | Enables Security Group Tag (SGT) propagation at Layer 2 on Cisco TrustSec Security (CTS) interfaces. |

show cts platform

To display Cisco TrustSec configuration statistics for a platform, use the **show cts platform** command in user EXEC or privileged EXEC mode.

show cts platform [**interface** *interface-type*] **stats** [**detail**]

Syntax Description

| | |
|--|---|
| interface <i>interface-type</i> | (Optional) Displays information about the interfaces available on the platform. |
| stats | Displays platform-specific Cisco TrustSec statistics. |
| detail | (Optional) Displays detailed information for platform-specific Cisco TrustSec statistics. |

Command Modes

EXEC (>)
Privileged EXEC (#)

Command History

Release Modification

15.3(2)T This command was introduced.

Examples

The following is sample output from the **show cts platform interface *interface-type* stats detail** command, which displays detailed output for platform-specific Cisco TrustSec statistics:

```
Device# show cts platform interface gigabitethernet 0/0/0 stats detail

Interface gigabitethernet 0/0/0
L2-SGT Statistics
Pkts In : 31627
Pkts (policy SGT assigned) : 24
Pkts Out : 6866
Pkts Drop (malformed packet): 0
Pkts Drop (invalid SGT) : 0
```

Related Commands

| Command | Description |
|-----------------------|--|
| cts manual | Enables an interface for Cisco TrustSec. |
| cts sxp enable | Configures SXP on a network device. |
| propagate sgt | Enables SGT propagation at Layer 2 on Cisco TrustSec interfaces. |

show cts server-list

To display the list of RADIUS servers available to Cisco TrustSec (CTS) seed and nonseed devices, use the **show cts server-list** command in user EXEC or privileged EXEC mode.

show cts server-list

Syntax Description

This command has no commands or keywords.

Command Modes

Privileged EXEC (#) User EXEC (>)

Command History

| Release | Modification |
|-------------|---|
| 12.2(33)SXI | This command was introduced on the Catalyst 6500 series switches. |
| 15.2(2)T | This command was integrated into Cisco IOS Release 15.2(2)T. |

Usage Guidelines

This command is useful for gathering CTS RADIUS server address and status information.

Examples

The following example displays the CTS RADIUS server list:

```
Router> show cts server-list
CTS Server Radius Load Balance = DISABLED
Server Group Deadtime = 20 secs (default)
Global Server Liveness Automated Test Deadtime = 20 secs
Global Server Liveness Automated Test Idle Time = 60 mins
Global Server Liveness Automated Test = ENABLED (default)
Preferred list, 1 server(s):
 *Server: 10.0.1.6, port 1812, A-ID 1100E046659D4275B644BF946EFA49CD
      Status = ALIVE
      auto-test = TRUE, idle-time = 60 mins, deadtime = 20 secs
Installed list: ACSServerList1-0001, 1 server(s):
 *Server: 101.0.2.61, port 1812, A-ID 1100E046659D4275B644BF946EFA49CD
      Status = ALIVE
      auto-test = TRUE, idle-time = 60 mins, deadtime = 20 secs
```

Related Commands

| Command | Description |
|--|---|
| address ipv4 (config-radius-server) | Configures the RADIUS server accounting and authentication parameters for PAC provisioning. |
| pac key | Specifies the PAC encryption key. |

show cts sxp

To display Cisco TrustSec Security Group Tag (SGT) Exchange Protocol (CTS-SXP) connection or source IP-to-SGT mapping information, use the **show cts sxp** command in user EXEC or privileged EXEC mode.

show cts sxp {connections | sgt-map} [{brief | vrf instance-name}]

Syntax Description

| | |
|--------------------------|---|
| connections | Displays Cisco TrustSec SXP connections information. |
| sgt-map | Displays the IP-to-SGT mappings received through SXP. |
| brief | (Optional) Displays an abbreviation of the SXP information. |
| vrf instance-name | (Optional) Displays the SXP information for the specified Virtual Routing and Forwarding (VRF) instance name. |

Command Default

None

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

| Release | Modification |
|---------------------------|---|
| 12.2(33)SX13 | This command was introduced on the Catalyst 6500 series switches. |
| 12.2(50)SG7 | This command was integrated on the Catalyst 4000 series switches. |
| 12.2(53)SE2 | This command was integrated into Cisco IOS Release 12.2(53)SG7 on the Catalyst 3750(E) and 3560(E) series switches. |
| Cisco IOS XE Release 3.4S | This command was integrated into Cisco IOS XE Release 3.4S. |
| 15.1(3)S | This command was integrated into Cisco IOS Release 15.1(3)S. |
| 15.4(1)T | This command was integrated into Cisco IOS Release 15.4(1)T. |

Examples

The following example displays the SXP connections using the **brief** keyword:

```
Device# show cts sxp connection brief

SXP                : Enabled
Default Password  : Set
Default Source IP : Not Set
Connection retry  : 10 secs
Reconcile period  : 120 secs
Retry open timer  : is not running

-----
Peer_IP           Source_IP         Conn Status      Duration
-----
10.10.10.1        10.10.10.2       On               0:00:02:14 (dd:hr:mm:sec)
10.10.2.1         10.10.2.2        On               0:00:02:14 (dd:hr:mm:sec)
```

Total num of SXP Connections = 2

The following example displays the CTS-SXP connections:

```
Device# show cts sxp connections

SXP                : Enabled
Default Password   : Set
Default Source IP  : Not Set
Connection retry open period: 10 secs
Reconcile period: 120 secs
Retry open timer is not running
-----
Peer IP            : 10.10.10.1
Source IP          : 10.10.10.2
Set up             : Peer
Conn status        : On
Connection mode    : SXP Listener
Connection inst#   : 1
TCP conn fd        : 1
TCP conn password: not set (using default SXP password)
Duration since last state change: 0:00:01:25 (dd:hr:mm:sec)
-----
Peer IP            : 10.10.2.1
Source IP          : 10.10.2.2
Set up             : Peer
Conn status        : On
Connection mode    : SXP Listener
TCP conn fd        : 2
TCP conn password: not set (using default SXP password)
Duration since last state change: 0:00:01:25 (dd:hr:mm:sec)
Total num of SXP Connections = 2
```

The following example displays the CTS-SXP connections for a bi-directional connection when the device is both the speaker and listener:

```
Device# show cts sxp connections

SXP : Enabled
Highest Version Supported: 4
Default Password : Set
Default Source IP: Not Set
Connection retry open period: 120 secs
Reconcile period: 120 secs
Retry open timer is running
-----
Peer IP : 2.0.0.2
Source IP : 1.0.0.2
Conn status : On (Speaker) :: On (Listener)
Conn version : 4
Local mode : Both
Connection inst# : 1
TCP conn fd : 1(Speaker) 3(Listener)
TCP conn password: default SXP password
Duration since last state change: 1:03:38:03 (dd:hr:mm:sec) :: 0:00:00:46 (dd:hr:mm:sec)
```

The following example displays output from a CTS-SXP listener with a torn down connection to the SXP speaker. Source IP-to-SGT mappings are held for 120 seconds, the default value of the Delete Hold Down timer.

```

Device# show cts sxp connections

  SXP                : Enabled
  Default Password  : Set
  Default Source IP: Not Set
  Connection retry open period: 10 secs
  Reconcile period: 120 secs
  Retry open timer is not running
-----
Peer IP           : 10.10.10.1
Source IP        : 10.10.10.2
Set up           : Peer
Conn status      : Delete_Hold_Down
Connection mode  : SXP Listener
Connection inst# : 1
TCP conn fd     : -1
TCP conn password: not set (using default SXP password)
Delete hold down timer is running
Duration since last state change: 0:00:00:16 (dd:hr:mm:sec)
-----
Peer IP           : 10.10.2.1
Source IP        : 10.10.2.2
Set up           : Peer
Conn status      : On
Connection inst# : 1
TCP conn fd     : 2
TCP conn password: not set (using default SXP password)
Duration since last state change: 0:00:05:49 (dd:hr:mm:sec)
Total num of SXP Connections = 2

```

Related Commands

| Command | Description |
|----------------------------------|---|
| cts sxp connection peer | Enters the Cisco TrustSec SXP peer IP address and specifies if a password is used for the peer connection |
| cts sxp default password | Configures the Cisco TrustSec SXP default password. |
| cts sxp default source-ip | Configures the Cisco TrustSec SXP source IPv4 address. |
| cts sxp enable | Enables Cisco TrustSec SXP on a device. |
| cts sxp log | Enables logging for IP-to-SGT binding changes. |
| cts sxp reconciliation | Changes the Cisco TrustSec SXP reconciliation period. |
| cts sxp retry | Changes the Cisco TrustSec SXP retry period timer. |

show cts sxp filter-group

To display information about the configured filter groups, use the **show cts sxp filter-group** command in privileged EXEC mode.

```
show cts sxp filter-group [speaker | listener | {speaker | listener} filter-group-name]
[detailed]
show cts sxp filter-group [global] [detailed]
```

| Syntax Description | | |
|--------------------------|--|--|
| speaker | Displays information about the speaker filter group or groups. | |
| listener | Displays information about the listener filter group or groups. | |
| filter-group-name | Displays information about a specific filter group. | |
| global | Displays information about the global groups. | |
| detailed | Displays detailed information about a specific group or a set of groups. | |

Command Default No default behavior or values.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 16.6.1 | This command was introduced. |

Example

The following example shows how to display the details of a specific speaker filter group:

```
Device# show cts sxp filter-group speaker group_1
  Filter-group: group_1
    Filter-name: filter_1
      peer 1.1.1.1
      peer 1.1.1.2
```

The following example shows how to display the complete details of all the listener filter groups:

```
Device# show cts sxp filter-group listener detailed
Global Listener Filter Name: filter_1
Filter-rules:
10 deny ipv4 1.1.1.0/24 permit sgt 2 (0)
Total Matches: 0
Default Deny Count: 0

Global Speaker Filter Name: filter_1
Filter-rules:
10 deny ipv4 1.1.1.0/24 permit sgt 2 (0)
Total Matches: 0
Default Deny Count: 0

Listener Groups:
```

show cts sxp filter-group

```

Filter-group: group_1
Filter-name: filter_1
Filter-rules:
10 deny ipv4 1.1.1.0/24 permit sgt 2 (0)
Total Matches: 0
Default Deny Count: 0
peer 1.1.1.1

Speaker Groups:

Filter-group: group_3
peer 1.1.1.1

```



Note The number within round brackets against each rule is the count of the number of times that rule has matched.

Related Commands

| Command | Description |
|------------------------------------|--|
| cts sxp filter-enable | Enables filtering. |
| cts sxp filter-group | Creates a filter group for grouping a set of peers and applying a filter list to them |
| cts sxp filter-list | Creates a SXP filter list to hold a set of filter rules for filtering IP-SGT bindings in a SXP connection. |
| show cts sxp filter-list | Displays information about the configured filter lists. |
| debug cts sxp filter events | Logs events related to the creation, deletion and update of filter-lists and filter-groups. |

show cts sxp filter-list

To display information about the configured filter lists, use the **show cts sxp filter-list** command in privileged EXEC mode.

```
show cts sxp filter-list [filter-list-name]
```

| Syntax Description | <i>filter-list-name</i> Name of the filter list. | | | | |
|---------------------------|--|---------|--------------|--------|------------------------------|
| Command Default | No default behavior or values. | | | | |
| Command Modes | Privileged EXEC (#) | | | | |
| Command History | <table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>16.6.1</td> <td>This command was introduced.</td> </tr> </tbody> </table> | Release | Modification | 16.6.1 | This command was introduced. |
| Release | Modification | | | | |
| 16.6.1 | This command was introduced. | | | | |

Example

The following example shows how to display the rules in a specific filter list:

```
Device# show cts sxp filter-list filter_1
Filter-name: filter_1
10 deny ipv4 1.1.1.0/24 permit sgt 2 (0)
```

The following example shows how to display all the filter lists and their corresponding rules:

```
Device# show cts sxp filter-list
Filter-name: filter_1 (0)
10 deny ipv4 1.1.1.0/24 permit sgt 2 (0)
Filter-name: default_sgt (0)
10 permit sgt all (0)
20 deny ipv4 5.5.5.0/24 (0)
30 deny ipv6 ::/0 (0)
40 permit ipv6 66:99::88/128 (0)
50 permit sgt 100 200 300 (0)
60 deny sgt 99 (0)
90 permit ipv4 8.8.8.8/32 deny sgt 89 (0)
100 deny ipv6 1::1/128 permit sgt 90 70 (0)
```



Note The number within round brackets against each rule is the count of the number of times that rule has matched.

| Related Commands | Command | Description |
|------------------|------------------------------|--------------------|
| | cts sxp filter-enable | Enables filtering. |

| Command | Description |
|------------------------------------|--|
| cts sxp filter-group | Creates a filter group for grouping a set of peers and applying a filter list to them. |
| cts sxp filter-list | Creates a SXP filter list to hold a set of filter rules for filtering IP-SGT bindings in a SXP connection. |
| show cts sxp filter-group | Displays information about the configured filter groups. |
| debug cts sxp filter events | Logs events related to the creation, deletion and update of filter-lists and filter-groups. |

show cws

To display Cloud Web Security content-scan information, use the **show cws** command in user EXEC or privileged EXEC mode.

```
show cws {session {active [{detail | egress-vrf vrf-number | ingress-vrf vrf-number | ip-addr ip-address
[all]]} | history sessions} | statistics [{all | detailed | failures | memory-usage}] | summary}
```

Syntax Description

| | |
|----------------------------------|--|
| session | Displays Cloud Web Security session information. |
| active | Displays active sessions. |
| detail | (Optional) Displays Cloud Web Security content-scan session details. |
| egress-vrf | (Optional) Displays information about the virtual routing and forwarding (VRF) instance at the egress interface. |
| <i>vrf-number</i> | (Optional) Egress or ingress VRF ID. Valid values are from 0 to 1024. |
| ingress-vrf | (Optional) Displays information about the VRF instance at the ingress interface. |
| ip-addr <i>ip-address</i> | (Optional) Displays information about the specified IP address. |
| all | (Optional) Displays information about all sessions. |
| history | Displays information about terminated sessions. |
| <i>sessions</i> | Number of sessions. Valid values are from 1 to 512. |
| statistics | Displays statistics of the content scanned by Cloud Web Security. |
| detailed | (Optional) Displays detailed statistics of the content scanned. |
| failures | (Optional) Displays Cloud Web Security content-scan failure statistics. |
| memory-usage | (Optional) Displays Cloud Web Security content-scan memory usage statistics. |
| summary | Displays a summary of the Cloud Web Security content scan information. |

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

| Release | Modification |
|----------|--|
| 15.4(2)T | This command was introduced. This command replaces the show content-scan command. |

Usage Guidelines

Cloud Web Security provides content scanning of HTTP and secure HTTP (HTTPS) traffic and malware protection services to web traffic. The content-scanning process redirects client web traffic to the Cloud Web

Security servers. These servers scan the web traffic content and allow or block traffic based on compliance with the configured policies and thus protect clients from malware. Content scanning is enabled on an Internet-facing WAN interface to protect the web traffic that goes out. Use the **show cws** command to view Cloud Web Security content-scan information.

The **show cws session history** command displays information about a maximum of 512 terminated sessions.

Examples

The following is sample output from the **show cws session history** command:

```
Device# show cws session history 6

Protocol  Source                Destination            Bytes      URI                Time
-----
HTTP      192.168.100.2:1347    209.165.201.104:80    (102:45)   www.google.com
00:01:13
HTTP      192.168.100.2:1326    209.165.201.106:80    (206:11431) www.google.com
00:12:55
HTTP      192.168.100.2:1324    209.165.201.105:80    (206:11449) www.google.com
00:15:20
HTTP      192.168.100.2:1318    209.165.201.105:80    (206:11449) www.google.com
00:17:43
HTTP      192.168.100.2:1316    209.165.201.104:80    (206:11449) www.google.com
00:20:04
HTTP      192.168.100.2:1315    10.254.145.107:80     (575:1547)  alert.scansafe.net
00:21:32
```

The following table describes the significant fields shown in the display.

Table 54: show cws session history Field Descriptions

| Field | Description |
|-------------|---|
| Protocol | Protocol used for content scanning. |
| Source | IP address of the source with the port number. |
| Destination | IP address of the destination with the port number. |
| URI | Uniform Resource Identifier (URI) that identifies a name or a resource on the Internet. |
| Time | Duration of time when a session was terminated. |

The following is sample output from the **show cws statistics** command:

```
Device# show cws statistics

Current HTTP sessions: 3
Current HTTPS sessions: 0
Total HTTP sessions: 11
Total HTTPS sessions: 0
White-listed sessions: 0
Time of last reset: 00:01:58
```

The following table describes the fields shown in the display.

Table 55: show cws statistics Field Descriptions

| Field | Description |
|------------------------|--|
| Current HTTP sessions | Number of current HTTP sessions. |
| Current HTTPS sessions | Number of current secure HTTP (HTTPS) sessions. |
| Total HTTP sessions | Total number of HTTP sessions. |
| Total HTTPS sessions | Total number of HTTPS sessions. |
| White-listed sessions | Number of sessions that appear on the allowed listing. An allowed list is an approved list of entities that are provided a particular privilege, service, mobility, access, or recognition. Allowed listing means to grant access. |
| Time of last reset | Duration of time since sessions were last reset. |

The following is sample output from the **show cws statistics failures** command:

```
Device# show cws statistics failures
```

```
Reset during proxy Mode:           0
HTTPS reconnect failures:         0
Buffer enqueue failures:          0
Buffer length exceeded:           0
Particle coalesce failures:       0
L4F failures:                     0
Lookup failures:                  0
Memory failures:                  0
Tower unreachable:                0
Resets sent:                       0
```

The following table describes the significant fields shown in the display.

Table 56: show cws statistics failures Field Descriptions

| Field | Description |
|----------------------------|--|
| Reset during proxy Mode | Reset messages that are received when content scan is in proxy mode. |
| HTTPS reconnect failures | Connection failures while reconnecting to HTTPS. |
| Buffer enqueue failures | Buffering queue failures. When a packet fails to reach its destination, the packet is buffered in a queue for a retry. This queue to which packets are buffered can fail, and this failure is added to the statistics. |
| Buffer length exceeded | Packets that exceed the buffer length. |
| Particle coalesce failures | Packet defragmentation failures. When content scan receives packet fragments, these fragments are joined together or coalesced, and any failures during the coalescing are added to the statistics. |

| Field | Description |
|-------------------|---|
| L4F failures | Layer 4 Forwarding (L4F) failures. When content scan and L4F is out of sync with each other, the statistics are incremented. Note We recommend that you inform TAC, if this counter increments rapidly. |
| Lookup failures | Content-scan entry lookup failures. During normal packet flows, content scan entries are checked at certain points. When such a lookup fails (when it was not expected to fail), it is added to the statistics. |
| Memory failures | Memory failures in the content scan subsystem (can be malloc, chunk_malloc, list, and so on). |
| Tower unreachable | Cloud Web Security tower unreachable during packet flows. |
| Resets sent | Packet processing errors. During packet processing, if errors are encountered, reset messages are sent to end hosts. |

The following sample output from the **show cws session active egress-vrf 1** command:

```
Device# show cws session active egress-vrf 1
```

```
Protocol      Source          Destination      Bytes           Time
HTTP [0]:    10.1.1.1:25176  10.2.2.1:80     (262:10495)    00:00:00
              URI: 10.2.2.1
              Username/usergroup(s): /
```

Related Commands

| Command | Description |
|------------------|---|
| cws out | Enables Cloud Web Security content scanning on an egress interface. |
| debug cws | Enables Cloud Web Security debugging. |

show cws tower-whitelist

To display allowed lists downloaded from the Cloud Web Security tower, use the **show cws tower-whitelist** command in privileged EXEC mode.

```
show cws tower-whitelist [{stats}]
```

Syntax Description

stats (Optional) Displays Cloud Web Security tower allowed list statistics.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|----------------------------|------------------------------|
| Cisco IOS Release 15.5(1)T | This command was introduced. |

Usage Guidelines

Allowed list patterns from the Cloud Web Security tower are not stored in the configuration. However, allowed list patterns configured through the CLI are stored in the configuration. Both, patterns configured via the CLI and patterns downloaded from the tower can be used for allowed listing. To view allowed listing patterns, use the **show cws tower-whitelist** command.

Examples

The following is sample output from the **show cws tower-whitelist** command. The output fields are self-explanatory.

```
Device# show cws tower-whitelist

Last modified time at tower : Wed, 06 Nov 2014 05:47:52 UTC
Domain names:
.*redhat.*
.*xerox.*
.*yahoo.*
Extended IP access list cws-internal-dnld-wl-acl
 10 permit ip 10.10.1.16 0.0.0.15 any
 20 permit ip any host 202.3.77.184
User-agent patterns:
mozilla
Safari
```

The following is sample output from the **show cws tower-whitelist stats** command:

```
Device# show cws tower-whitelist statistics

Total Connect Request:                13
Total Connect Response:               13
Total WL download request:            13
SSL failures:                          0
WL download response:
  Total success response:              1
  Total no config change:              7
  Total no config:                     0
  Total other responses (Other than 200/304/404): 5
  Total other failures (no encoding/HTTP version): 0
XML parse errors:                     0
```

```

Memory failures:                                0

XML parser stats:
  Src ACLs      Dst ACLs      Domain-name      User-agent
    1           1           1                2

```

The following table describes the significant fields shown in the display.

Table 57: show cws tower-whitelist stats Field Descriptions

| Field | Description |
|--|--|
| Total Connect Request | Connect requests sent to the Cloud Web Security tower. |
| Total Connect Response | Responses to connect requests sent back by the Cloud Web Security tower. |
| Total WL download request | Requests sent to the Cloud Web Security tower for downloading allowed listing patterns. |
| SSL failures | Secure Sockets Layer (SSL) handshake failures due to missing or wrong certificates in the router. |
| WL download response | Responses from the tower for allowed listing download requests. |
| Total success response | 200 OK responses received by using new allowed listing patterns from the tower. |
| Total no config change | 304 responses received from the tower indicating that patterns were not changed since the last download. |
| Total no config | 404 responses received from the tower indicating that there are no allowed listing patterns for download, and no allowed listing patterns are removed for that device/group. |
| Total other responses (Other than 200/304/404) | Responses to allowed listing download requests, excluding HTTP messages 200 (OK), 304 (File not modified), and 404 (File not found). |
| Total other failures(no encoding/HTTP version) | Responses with missed HTTP version, or XML files that do not include an encoding attribute. |
| XML parse errors | XML parser failures such as invalid tags. |
| Memory failures | Memory allocation failures during allowed listing download. |

Related Commands

| Command | Description |
|--|--|
| parameter-map type inspect cws global | Configures a global Cloud Web Security parameter map and enters parameter-map type inspect configuration mode. |
| whitelist download enable | Enables the download of allowed listing from the Cloud Web Security tower. |