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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

Command History

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: 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 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.

Field	Description
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.
ip-address	(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                      CTCP_ACK_R
                          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.

Field	Description
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.
error	(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] [fvrf] [**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).
fvrf	(Optional) Displays debug conditions related to the front-door virtual private network (VPN) routing and forwarding (FVRF) instance.
gdoi-group *groupname*	(Optional) Displays debug conditions related to the Group Domain of Interpretation (GDOI) group filter. • The *groupname*value is the name of the GDOI group.
isakmp profile *profile-name*	(Optional) Displays debug conditions related to the Internet Security Association Key Management Protocol (ISAKMP) profile filter. • The *profile-name*value is the name of the profile filter.
ivrf	(Optional) Displays debug conditions related to the inside VRF (IVRF) instance.
local *ip-address*	(Optional) Displays debug conditions related to the local address debug condition filters. • The *ip-address* 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 *username*	(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.
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** *groupname* **, isakmp profile** *profile-name* **, local** *ip-address* **,**and **username** *username* 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 *map-name*	(Optional) Displays only the crypto dynamic map set with the specified *map-name*.

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-SAs and IPSec sessions are active and how many Diffie-Hellman 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 IP Security (IPSec) sessions are active and how many Diffie-Hellman keys are in use for each hardware crypto engine. The show crypto eli command also allows you to see how far an ISA is from reaching its maximum limit.

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 security associations (SAs).

(The eli component of the command calls the Encyption Layer Interface.)

Examples

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

```
Router# 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:

```
Router# 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 queueing (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. • 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.
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 *key-name* 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.

Command	Description
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.

Release	Modification
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.
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.

Usage Guidelines

No specific usage guidelines apply to hardware accelerators.

The **show crypto engine accelerator statistic platform** command displays the output from the following **show** commands, as listed in the order below:

- **show platform software ipsec fp active encryption-processor status**
- **show platform software ipsec fp active encryption-processor statistics**
- **show platform software ipsec fp active encryption-processor registers**

- **show platform hardware qfp active feature ipsec datapath drops**
- **show platform hardware qfp active feature ipsec datapath memory**

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 compres
              0 bytes bypass decompres                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.

Field	Description
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.
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).

Field	Description
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).
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.

Field	Description
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.
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
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.
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	Number of packets dropped. **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).
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.

Field	Description
Illegal Clear Packet	Number of illegal clear packets.
GRE Errors	Number of GRE errors due to invalid packets or invalid SAs. **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.
SPD Errors	Number of security policy database (SPD) errors. **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."
HA Standby Drop	Number of packet drops on a High Availability (HA) standby IPsec VPN SPA. **Note** The standby IPsec VPN SA 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.
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.

Field	Description
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.
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.

Field	Description
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.
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.

Field	Description
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.
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.

Command	Description
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 *group-name*	(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 *ip-address*	(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.

Release	Modification
12.4(11)T	This command was modified. The **group** *group-name* 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.
15.3(2)T	This command was modified. The **cts-sgt** and **long-sa-lifetime** keywords were added. The output was enhanced for the following forms of the command: • **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 modified. The **cts-sgt** and **long-sa-lifetime** keywords were added. The output was enhanced for the following forms of the command: • **show crypto gdoi**: Shows the 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.

Release	Modification
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 : 0xFCD0DD8333235B1652FA922BE85FAD65
  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.

Field	Description
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).
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.

Field	Description
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 sents	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.
KEK POLICY	List of details for the KEK policy.
Rekey Transport Type	Type of transport for rekey messages (Unicast or Multicast).

Field	Description
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: • 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: • 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.

Field	Description
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.
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).

Field	Description
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	Next SID client operation. The possible values are QUERY, NOTIFY, OR UPDATE. For the local KS: • QUERY: Has not received the previous SID information for the local KS from *any* 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) For the peer KS: • QUERY: Has not received any SID information for the peer KS from *the* 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 *groupname*	SID details for cooperative KSs for the group. If no redundancy is configured for the group, the following message is displayed: `*NO* redundancy configured for this group.`
Cooperative key server infra Version	Version of the cooperative KS Protocol Infrastructure for the current GET VPN software version.

Field	Description
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.
# 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.

Field	Description
TEK Lifetime	TEK lifetime. The TEK lifetime might not match the configured TEK lifetime on the KS for two reasons: • The GM receives the *remaining* 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. Also, the SID length (group size) on the first registration will always be 24 bits (MEDIUM) and will update after the first registration.

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.
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

identity-tag	(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.

Field	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 master 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 slave 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 master gateway and CLB Slave refers to a slave 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 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

policy-name	(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.

Examples

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
```

Examples

```
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

profile-name	(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 [*name*| *default*]

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.
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*]| **fvrf** *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.
fvrf *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           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: 86400/361 sec
Device# show crypto ikev2 sa
Tunnel-id   Local          Remote             fvrf/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.

Field	Description
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.
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:1, Status:UP-ACTIVE, IKE count:1, CHILD count:1
Tunnel-id   Local           Remote          fvrf/ivrf         Status
1           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: 86400/65 sec
CHild sa: local selector  10.0.0.1/0 - 10.0.0.1/65535
          remote selector 10.0.0.2/0 - 10.0.0.2/65535
          ESP spi in/out: 0x9360A95/0x6C340600
          CPI in/out: 0x9FE5/0xC776
Router# show crypto ikev2 session detailed
Session-id:1, Status:UP-ACTIVE, IKE count:1, CHILD count:1
Tunnel-id   Local          Remote          fvrf/ivrf          Status
1           10.0.0.1/500    10.0.0.2/500      (none)/(none)      READY
      Encr: 3DES, Hash: SHA96, DH Grp:2, Auth: PSK
      Life/Remaining/Active Time: 86400/86157/248 sec
```

```
      CE id: 0, Session-id: 1, MIB-id: 1
      Status Description: Negotiation done
      Local spi: 750CBE827434A245       Remote spi: 4353FEDBABEBF24C
      Local id:          10.0.0.1        Remote id:          10.0.0.2
      Local req mess id:    0           Remote req mess id: 0
      Local next mess id:    0          Remote next mess id: 2
      Local req queued:    0            Remote req queued: 0
      Local window:    5                Remote window: 5
      DPD configured for 0 seconds
      NAT-T is not detected
Child sa: local selector  10.0.0.1/0 - 10.0.0.1/65535
          remote selector 10.0.0.2/0 - 10.0.0.2/65535
          ESP spi in/out: 0x9360A95/0x6C340600
          CPI in/out: 0x9FE5/0xC776
          AH spi in/out: 0x0/0x0
          Encr: AES CBC, keysize: 128, esp_hmac: SHA96
          ah_hmac: Unknown - 0, comp: IPCOMP_LZS, 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.
fvrf/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.

Field	Description
Status Description	Description of the IKEv2 tunnel status.
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 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.

Field	Description
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.

Examples

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                           7718           0           0           0

ERROR NOTIFY


OTHER NOTIFY

NAT_DETECTION_SOURCE_IP               7718           0           0           0
NAT_DETECTION_DESTINATION_IP          7718           0           0           0


CONFIG PAYLOAD TYPE                     TX          RX


OTHER COUNTERS
```

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

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.
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.

Field	Description
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.

Field	Description
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: hw1
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: hw1
Inside interface list: FastEthernet0/0, Serial1/0,
Outside interface: Serial0/0
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.

Field	Description
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.
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 Name	ESP Encryption Transform and Description	ESP Authentication Transform and Description
#$!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.
ipv4-address	(Optional) Displays IPsec SAs for an IPv4 peer.
ipv6-address	(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 *map-name* 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.
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 *type* and *number* arguments were added. The **peer** keyword, the **vrf** keyword, and the *fvrf-name* argument were added. The **address** keyword was added to the **peer** keyword string. The **vrf** keyword and *ivrf-name* 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: Tunnel1
   Crypto map tag: Tunnel1-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 (recv) 0, #pkts verify failed: 0
     #pkts invalid identity (recv) 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 (recv) 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 (recv) 0, #pkts verify failed: 0
     #pkts invalid identity (recv) 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 (recv) 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.
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.

Field	Description
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.

Field	Description
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 (recv)	Received packets that have the wrong protocol field.
pkts verify failed	Received packets that failed the hash digest check.
pkts invalid identity (recv)	Packets that could not find the associated selector after decryption.
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 s**how 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 aesset: { 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.

Command	Description
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

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

Field	Description
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

ipaddress	(Optional) The IP address of the specific peer. **Note** If the optional *ipaddress* argument is not included with the command, a summarization of all peers is displayed.
ipv6address	(Optional) The IPv6 address of the specific peer.
config	(Optional) Displays detailed information about all peers or a specific peer.
peername	(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 *profilename*	(Optional) Displays ISAKMP profile details specified by the profile name.
vrf *vrfname*	(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 *profilename*and vrf *vrfname*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.
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 *vrfname*	(Optional) Displays IKE SA details about the specified VRF. • The *vrfname*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 *vrfname* 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.

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.

State	Explanation
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*]

Syntax Description

keyname	Name of a generated key pair.

Command Modes

P rivileged 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.
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 a router name is "router1.cisco.com," the key name is "router1.cisco.com.server."

Examples

The following is sample output from 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
 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 "pki1-72a.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 pki1-72a.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:pki1-72a.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:pki1-72a.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

```
Router#
```

The following example shows how to lock the key "pki1-72a.cisco.com." 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 pki1-72a.cisco.com passphrase cisco1234
!
Router# show crypto key mypubkey rsa
% Key pair was generated at:20:29:41 GMT Jun 20 2003
Key name:pki1-72a.cisco.com
Usage:General Purpose Key
*** 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
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: 07:38:04 GMT Oct 02 2009
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.
map-name	Name of the specified crypto map.
interface *interface*	(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.

Release	Modification
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 *map-tag*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.
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 *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 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.
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.

Command	Description
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 *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.

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	The reason for the failure, which are: • 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 *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.

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.

Command	Description
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 *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 Reelease 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: • 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.

Field	Description
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.
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 *vrf-name*	(Optional) Displays the parameters for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance.
index *tunnel-mib-index*	(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.

Field	Description
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.
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

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 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
```

Related Commands

Command	Description
show crypto mib ipsec flowmib history failure size	Displays the size of the IPSec failure history table.

Command	Description
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: • 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. • 1--Indicates an IP address identity type. • 2--Indicates a hostname identity type.

Field	Description
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.
Remote type	The type of remote peer identity. • 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 *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 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.

Field	Description
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.
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: • 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. • 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. • 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.

Field	Description
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 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 *peer-mib-index*	(Optional) Displays MIB information for the specified peer. The peer MIB index is an integer, 0-65535.
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.

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.
Local type	The type of local peer identity. • 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. • 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 *tunnel-mib-index*	(Optional) Displays tunnel MIB information for the specified tunnel. The tunnel MIB index is an integer, 0-65535.
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.

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. • 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. • 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.

Field	Description
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.
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.

Field	Description
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 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.

Command Modes

Privileged EXEC (#)

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.

Command	Description
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

trustpoint-name	(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 *trustpoint-name* 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 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 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.

Field	Description
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.
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

cs-label	(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. • 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.

Certificate Server State	Description
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 *only* when testing and building simple networks. This command *must* 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.)

Field	Description
Database Level	The type of data that is stored in the certificate enrollment database--Minumum, 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

cs-label	Name of the certificate server. The name must match the name specified through the **crypto pki server** command.
start -number	(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.
end-number	(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               Expire 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               Expire 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

cs-label	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

cs-label	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.
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:
RA certificate requests:
  ReqID  State      Fingerprint                       SubjectName
--------------------------------------------------------------
RA rollover certificate requests:
  ReqID  State      Fingerprint                       SubjectName
  --------------------------------------------------------------
Router certificates requests:
  ReqID  State      Fingerprint                       SubjectName
--------------------------------------------------------------
1      pending    A426AF07FE3A4BB69062E0E47198E5BF hostname=client
  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 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

name	(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 *label* 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: 0FFEBBDC1B6F6D9D0EA7875875E4C695
   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=r1 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=r1 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 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).
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: *time* (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 *time.* (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.

Field	Description
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
   Certficate 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): 00D01E474000000111C38A964400000002
  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	Specifes 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	• 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	• 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	• 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	• 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	• 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. **Note** These numbers are internal data values and are generally used by developers.

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. • The *type* 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 phase1 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. • The *group-name* value is the name of the group.
isakmp profile *profile-name*	(Optional) Displays crypto sessions using the ISAKMP profile. • The *profile-name* 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. • The *port-number* value can be from 1 to 65535. The default value is 500.
fvrf *fvrf-name*	(Optional) Displays status information about the front door virtual routing and forwarding (fVRF) session. • The *fvrf-name* value is the name of the fVRF session.
ivrf *ivrf-name*	(Optional) Displays status information about the inside VRF (iVRF) session. • The *ivrf-name* value is the name of the iVRF session. **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: • IPsec protected multipoint generic routing encapsulation (mGRE) • IPsec protected Point-to-Point GRE tunnels
summary *group-name*	(Optional) Displays a list of crypto session groups and associated group members.
username *username*	(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** *interface-type*, **isakmp group** *group-name*, **isakmp profile** *profile-name*, **summary**, and **username** *username* 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 **fvfr** and **ivrf** keywords and the *vrf-name* argument.

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.

Field	Description
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	
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	

IKE SA	IPsec SA	Tunnel Status	Description
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.
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 bytes out
                     0 paks/sec in                         0 paks/sec out
                     0 Kbits/sec in                        0 Kbits/sec out
                     0 packets decrypted                   0 packets encrypte
                     0 bytes before decrypt                0 bytes encrypted
                     0 bytes decrypted                     0 bytes after encr
                     0 packets decompressed                0 packets compress
                     0 bytes before decomp                 0 bytes before com
                     0 bytes after decomp                  0 bytes after comp
                     0 packets bypass decompr              0 packets bypass cs
                     0 bytes bypass decompres              0 bytes bypass comi
                     0 packets not decompress              0 packets not compd
                     0 bytes not decompressed              0 bytes not compre
                   1.0:1 compression ratio               1.0:1 overall
                  Last 5 minutes:
                     0 packets in                          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.

Command	Description
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

port	(Optional) Gigabit Ethernet interface number. A verbose status output for this interface is returned.
number	(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):

```
Router# 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:

```
Router# 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.

Command	Description
cts sxp enable	Configures SXP on a network device.
propagate sgt	Enables Security Group Tag (SGT) propagation at Layer 2 on Cisco TrustSec Security (CTS) 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)SXI3	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 open period: 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.