



# IPSec Commands

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This module describes the commands used to configure IPSec.

The IPSec and IKEv2 commands apply to the below listed Cisco NCS 540 series routers only:

- N540X-12Z16G-SYS-D
- N540X-12Z16G-SYS-A
  
- [ikev2 policy, on page 2](#)
- [ikev2 profile, on page 3](#)
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# ikev2 policy

To configure any parameters for the Internet Key Exchange Version 2 (IKEv2) policy, use the **ikev2 policy** command in XR Config mode.

```
ikev2 policy name { match { address local address | vrf { name | any } } | proposal name }
```

## Syntax Description

<i>name</i>	Specifies the name for the IKEv2 policy
<b>match</b>	Specifies that a match type follows
<b>address local</b> <i>address</i>	Specifies the ip address of the local interface to be associated with this IKEv2 profile
<b>vrf</b>	Configures VRF profile for the IKEv2 policy.
<i>name</i>	Specifies the name of the dedicated VRF profile
<b>any</b>	Specifies that the IKEv2 policy can use any matching VRF profile in the router.
<b>proposal</b> <i>name</i>	Specifies the IKEv2 proposal for the IKEv2 policy

## Command Default

None

## Command Modes

XR Config mode

## Command History

Release	Modification
Release 7.8.1	This command was introduced.

## Usage Guidelines

Before configuring IKEv2 policy, an IKEv2 proposal must be available in your router.

## Examples

This example shows how to create a IKEv2 policy:

```
RRouter# configure
Router (config)# ikev2 policy ikev2_policy_P2 match address local 5.22.16.52
Router (config)# ikev2 policy ikev2_policy_P2 match fvrf any
Router (config)# ikev2 policy ikev2_policy_P2 proposal ikev2_proposal_P1
Router (config)# commit
```

## ikev2 profile

To configure the parameters of an Internet Key Exchange Version 2 (IKEv2) profile, use the **ikev2 profile** command in XR Config mode.

```
ikev2 profile name { keyring ppk name | lifetime seconds | match { fvr { name | any } | identity remote } | authentication { local | remote } { pre-shared | rsa-signature } | pki trustpoint name }
```

Syntax Description		
<b>name</b>	<i>name</i>	Specifies the name of the IKEv2 profile
<b>keyring</b>	<i>name</i>	Configures the trustpoints used for user certificate validation
<b>keyring</b>	<i>ppk</i>	(Optional) When configured, PPK related IKEv2 packet exchange is enabled.
<b>lifetime</b>	<i>seconds</i>	Specifies the name of the trustpoint
<b>match</b>		Specifies that a match type follows
<b>fvr</b>		Configures the FVRF profile for the IKEv2 profile.
	<i>name</i>	Specifies the name of the dedicated FVRF profile.
<b>any</b>		Specifies that the IPSec profile can use any matching FVRF profile in the router.
<b>authentication</b>		Specifies that the IPSec Peer authentication method follows
<b>local</b>		Specifies that the authentication occurs on the source router.
<b>remote</b>		Specifies that the authentication occurs on the peer router.
<b>pre-shared</b>		Specifies that the authentication uses the pre-shared key available in the router
<b>rsa-signature</b>		Specifies that the authentication is X.509v3 certificate based on rsa signature
<b>identity</b>	<b>remote</b>	Specifies that the identity match for the IKEv2 profile is via the remote identity
<b>pki</b>	<i>trustpoint name</i>	Specifies the public key infrastructure trustpoint name in the IPSec profile

**Command Default** None

**Command Modes** XR Config mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.
	Release 24.1.1	The <b>keyring ppk</b> keyword is introduced in the <b>ikev2 profile</b> command.

**Usage Guidelines**

Before creating an IKEv2 profile, A keyring profile must be available in your router.

This example shows how to configure an IKEv2 profile:

```
Router#configure
Router(config)# ikev2 profile ikev2_prof_mgmt_P1 keyring key_mgmt_P1
Router(config)# ikev2 profile ikev2_prof_mgmt_P1 lifetime 600
Router(config)# ikev2 profile ikev2_prof_mgmt_P1 match identity remote address 5.22.16.25
255.255.0.0
Router(config)#commit
```

This example shows how to configure dynamic PPK for one or more peers or groups of peers, in the IKEv2 keyring.

```
Router#configure terminal
Router(config)#keyring dynamic
Router(config-ikev2-keyring)#peer peer1
Router(config-ikev2-keyring-peer)#ppk dynamic qkd required
Router(config-ikev2-keyring)#pre-shared-key cisco123!cisco123
Router(config-ikev2-keyring-peer)#address 10.0.0.1 255.0.0.0
Router(config)#ikev2 profile test
Router(config-ikev2-profile-test)#keyring dynamic
Router(config-ikev2-profile-test)#keyring ppk dynamic
Router(config-ikev2-profile-name)#match address 10.0.0.1 255.255.255.0
Router(config)#sks profile qkd type remote
Router(config-sks-profile)#kme server ipv4 192.0.2.34 port 10001
Router(config-ikev2-keyring-peer)#exit
Router(config)#exit
```

# ikev2 proposal

To configure the parameters for an Internet Key Exchange Version 2 (IKEv2) proposal, use the **ikev2 proposal** command in XR Config mode.

```
ikev2 proposal name { dh-group { 19 | 20 | 21 } | encryption { aes-gcm-128 | aes-gcm-256
| aes-cbc-128 | aes-cbc-192 | aes-cbc-256 } | integrity { sha-1 | sha-256 | sha-384 | sha-512 } | prf
{ sha-1 | sha-256 | sha-384 | sha-512 } }
```

## Syntax Description

<b>name</b>	Specifies the name for the IKEv2 proposal
<b>dh-group</b>	Specifies that the transform of the DH group follows. <b>Note</b> You can configure one or more DH groups by separating them by a comma.
<b>19</b>	Specifies the ECP group type DH Group-19 (256-bit)
<b>20</b>	Specifies the ECP group type DH Group-20 (384-bit)
<b>21</b>	Specifies the ECP group type DH Group-21 (512-bit)
<b>encryption</b>	Specifies that the type of encryption algorithm follows. <b>Note</b> You can configure one or more encryption algorithms by separating them by a comma.
<b>aes-gcm-128</b>	Specifies 128 bits encryption using the Advanced Encryption Standard (AES) with Galois/Counter Mode (AES-GCM).
<b>aes-gcm-256</b>	Specifies 256 bits encryption using the Advanced Encryption Standard (AES) with Galois/Counter Mode (AES-GCM).
<b>aes-cbc-128</b>	Specifies 128 bits encryption using the Advanced Encryption Standard (AES) with cipher-block chaining (CBC).
<b>aes-cbc-192</b>	Specifies 192 bits encryption using the Advanced Encryption Standard (AES) with cipher-block chaining (CBC).
<b>aes-cbc-256</b>	Specifies 256 bits encryption using the Advanced Encryption Standard (AES) with cipher-block chaining (CBC).
<b>integrity</b>	Specifies that the type of algorithm used to authenticate packets in IPSec follows. <b>Note</b> You can configure one or more integrity algorithms by separating them by a comma.
<b>sha-1</b>	Specifies that SHA-1 algorithm is used to authenticate in IPSec packets.
<b>sha-256</b>	Specifies that SHA-256 algorithm is used to authenticate in IPSec packets.
<b>sha-384</b>	Specifies that SHA-384 algorithm is used to authenticate in IPSec packets.
<b>sha-512</b>	Specifies that SHA-512 algorithm is used to authenticate in IPSec packets.

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**prf** Specifies the type of algorithm used to provide randomness for keying information in IPSec follows.

**Note** You can configure one or more PRF algorithms by separating them by a comma.

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**sha-1** Specifies that SHA-1 algorithm is used to provide randomness for keying information.

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**sha-256** Specifies that SHA-256 algorithm is used to provide randomness for keying information.

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**sha-384** Specifies that SHA-384 algorithm is used to provide randomness for keying information.

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**sha-512** Specifies that SHA-512 algorithm is used to provide randomness for keying information.

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**Command Default** None

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**Command Modes** XR Config mode

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Command History	Release	Modification
	Release 7.8.1	This command was introduced

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**Usage Guidelines** No specific guidelines impact the use of this command.

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**Examples** This example shows how to configure a IKEv2 profile:

```
Router# configure
Router(config)# ikev2 proposal ikev2_proposal_P1 prf sha-256
Router(config)# ikev2 proposal ikev2_proposal_P1 dh-group 20
Router(config)# ikev2 proposal ikev2_proposal_P1 integrity sha-256
Router(config)# ikev2 proposal ikev2_proposal_P1 encryption aes-cbc-256
Router(config)# commit
```

# ipsec profile

To create an IPSec profile, use the **ipsec profile** command in XR Config mode.

```
ipsec profile name set { ikev2-profile name | pfs { group19 | group20 | group21 } |
security-association lifetime seconds | transform-set name | responder-only }
```

Syntax Description	
<i>name</i>	Specifies the name for the IPSec profile
<b>ikev2-profile</b> <i>name</i>	Associates the specified IKEv2 profile with the IPSec profile.
<b>pfs</b>	Specifies that a DH group follows.
<b>group19</b>	Specifies the MODP group type DH Group1 (768-bit).
<b>group20</b>	Specifies the MODP group type DH Group2 (1024-bit).
<b>group21</b>	Specifies the MODP group type DH Group5 (1536-bit).
<b>security-association</b> <b>lifetime</b> <i>seconds</i>	Configures the duration of the security associations validity in seconds. The range of security association lifetime is 120-2592000 seconds. By default, the fixed lifetime value associated with SAs is 14400 seconds.
<b>transform-set</b> <i>name</i>	Associates the specified transform set with the IPSec profile.
<b>responder-only</b>	Allows a router configured with this command to respond to an initiation request from an IPSec peer router. The router cannot initiate an IPSec session.

**Command Default** None

**Command Modes** XR Config mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.
	Release 7.11.1	The <b>responder-only</b> keyword was introduced.

**Usage Guidelines** Before creating an IPSec profile, an IKEv2 profile and transform set must be available in your router.

## Examples

The following example iterates how to create an IPSec profile:

```
Router# config
Router(config)# ipsec profile set ikev2 profile ikev2_prof_mgmt_P2
Router(config)# ipsec profile set pfs group19
Router(config)# ipsec profile set security-association lifetime seconds 600
Router(config)# ipsec profile set transform-set ts_mgmt_P2
Router (config)# ipsec profile set responder-only
Router(config)# commit
```





## ipsec transform-set

To configure the transform set parameters of an IPSec profile, use the **ipsec transform-set** command in XR Config mode.

```
ipsec transform-set name { mode tunnel | transform { esp-192-aes | esp-256-aes |
esp-hmac-sha-256 | esp-hmac-sha-384 | esp-hmac-sha-512 | esp-hmac-sha1 } }
```

Syntax Description	Parameter	Description
	<i>name</i>	Specifies the name for the transform set.
	<b>mode</b>	Specifies that the IPSec channel type follows.
	<b>tunnel</b>	Specifies the IPSec channel between the interfaces is a tunnel.
	<b>transform</b>	Specifies that the algorithm used in the transform set follows.
	<b>esp-192-aes</b>	Specifies that the transform set uses the ESP-192-AES algorithm for encryption.
	<b>esp-256-aes</b>	Specifies that the transform set uses the ESP-256-AES algorithm for encryption.
	<b>esp-hmac-sha-256</b>	Specifies that the transform set uses the ESP-HMAC-SHA-256 algorithm for encryption.
	<b>esp-hmac-sha-384</b>	Specifies that the transform set uses the ESP-HMAC-SHA-384 algorithm for encryption.
	<b>esp-hmac-sha-512</b>	Specifies that the transform set uses the ESP-HMAC-SHA-512 algorithm for encryption.
	<b>esp-hmac-sha1</b>	Specifies that the transform set uses the ESP-HMAC-SHA1 algorithm for encryption.

**Command Default** No specific guidelines impact the use of this command.

**Command Modes** XR Config mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.

**Usage Guidelines** None

This example shows how to configure an IPSec transform set:

```
Router#configure
Router(config)# ipsec transform-set ts_mgmt_P2 mode tunnel
Router(config)# ipsec transform-set ts_mgmt_P2 transform esp-hmac-sha-256
Router(config)#commit
```

# keyring

To configure the keyring details of an IPSec profile, use the **keyring** command in XR Config mode.

```
keyring name peer ppk { manual | dynamic } name { address ip | pre-shared-key { clear | local | password } key }
```

Syntax Description	Parameter	Description
	<b>keyring</b> <i>name</i>	Specifies the name for the keyring profile
	<b>peer</b> <i>name</i>	Specifies the name of the peer interface
	<b>ppk</b> <b>manual/dynamic</b>	Provision the same PPK on both IKEv2 and IPsec initiator and responder manually or dynamically from an external key source.
	<b>address</b> <i>ip</i>	Specifies the ip address of the peer interface along with the prefix.
	<b>clear</b>	Specifies that the preshared key for IPSec communication is in cleartext format.
	<b>local</b>	Specifies that the preshared key for IPSec communication is a local passphrase.
	<b>password</b>	Specifies that the preshared key for IPSec communication is an encrypted string in hexadecimal format.
	<i>key</i>	Specifies the preshared key for IPSec communication.

**Command Default** No specific guidelines impact the use of this command.

**Command Modes** XR Config mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.
	Release 24.1.1	The <b>ppk manual/dynamic</b> keyword was introduced in the <b>keyring</b> command.

**Usage Guidelines** None

## Examples

This example shows how to configure the keyring parameters for IPSec:

```
Router# config
Router(config)# keyring key_mgmt_P1 peer ACADIA-2 address 5.22.16.25 255.255.0.0
Router(config)# keyring key_mgmt_P1 peer ACADIA-2 pre-shared-key cisco123
Router(config)# commit
```

This example shows how to configure the manual PPK for one or more peers or groups of peers, in the IKEv2 keyring.

```
Router#configure terminal
Router(config)#keyring manual
```

```
Router(config-ikev2-keyring)#peer peer1
Router(config-ikev2-keyring-peer)#ppk manual id cisco123 key password 060506324F41584B56
required
Router(config-ikev2-keyring)#pre-shared-key cisco123!cisco123
Router(config-ikev2-keyring-peer)#address 10.0.0.1 255.0.0.0
Router(config)#ikev2 profile test
Router(config-ikev2-profile-test)#keyring manual
Router(config-ikev2-profile-test)#keyring ppk manual
Router(config-ikev2-profile-name)#match address 10.0.0.1 255.255.255.0
Router(config-ikev2-keyring-peer)#exit
Router(config)#exit
```

## Examples

This example shows how to configure the dynamic PPK for one or more peers or groups of peers, in the IKEv2 keyring.

```
Router#configure terminal
Router(config)#keyring dynamic
Router(config-ikev2-keyring)#peer peer1
Router(config-ikev2-keyring-peer)#ppk dynamic qkd required
Router(config-ikev2-keyring)#pre-shared-key cisco123!cisco123
Router(config-ikev2-keyring-peer)#address 10.0.0.1 255.0.0.0
Router(config)#ikev2 profile test
Router(config-ikev2-profile-test)#keyring dynamic
Router(config-ikev2-profile-test)#keyring ppk dynamic
Router(config-ikev2-profile-name)#match address 10.0.0.1 255.255.255.0
Router(config)#sks profile qkd type remote
Router(config-sks-profile)#kme server ipv4 192.0.2.34 port 10001
Router(config-ikev2-keyring-peer)#exit
Router(config)#exit
```

# show ikev2 session detail

To view details of IKEv2 sessions in your router, use the **show ikev2 session detail** command in XR EXEC mode.

```
show ikev2 session detail
```

<b>Command Default</b>	None	
<b>Command Modes</b>	XR EXEC mode	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.8.1	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

**Examples** This example shows the usage of **show ikev2 session detail** command:

```
Router#RP/0/RP0/CPU0:R1#show platform security integrity statistics ima-cache block stats
RP/0/RP0/CPU0:ios# show ikev2 session detail
Session ID                               : 1
=====
Status                                   : UP-ACTIVE
IKE Count                                 : 1
Child Count                               : 1
IKE SA ID                                 : 1
-----
Local                                     : 1.1.1.1/500
Remote                                    : 1.1.1.2/500
Status(Description)                       : READY (Negotiation done)
Role                                       : Initiator
Encryption/Keysize                        : AES-CBC/128
PRF/Hash/DH Group                         : SHA1/SHA256/20
Authentication(Sign/Verify)              : PSK/PSK
Authentication(Sign/Verify)              : RSA/RSA (for certificate based)
Life/Active Time(sec)                    : 86400/2043
Session ID                                 : 1
Local SPI                                  : 3B95C7FCC6A69D0A
Remote SPI                                  : F44C4DBCFFEE67F07
Local ID                                   : 1.1.1.1
Remote ID                                   : 1.1.1.2

Child SA
-----
Local Selector                            : 1.1.1.1/1000 - 1.1.1.1/1000
Remote Selector                            : 1.1.1.2/1000 - 1.1.1.2/1000
ESP SPI IN/OUT                             : 0x6c7b15b7 / 0xbf55acd7
Encryption                                  : AES-GCM
Keysize                                     : 256
ESP HMAC                                    : None
```

## show ikev2 session

To display the statistics of an IKEv2 session in the router, use the **show ikev2 session** command in XR EXEC mode.

**show ikev2 session**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** XR EXEC mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

**Examples** This example shows the sample output of the **show ikev2 session** command:

```
Router# show ikev2 session
Session ID           : 1
=====
Status               : UP-ACTIVE
IKE Count            : 1
Child Count          : 1
IKE SA ID            : 1
-----
Local                : 1.1.1.1/500
Remote               : 1.1.1.2/500
Status(Description)  : READY (Negotiation done)
Role                 : Initiator
Child SA
-----
Local Selector       : 1.1.1.1/1000 - 1.1.1.1/1000
Remote Selector      : 1.1.1.2/1000 - 1.1.1.2/1000
ESP SPI IN/OUT      : 0x6c7b15b7 / 0xbf55acd7
```

# show ikev2 summary

To display the IKEv2 session summary of your router, use the **show ikev2 summary** command in XR EXEC mode.

**show ikev2 summary**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** XR EXEC mode

Command History	Release	Modification
	Release 7.8.1	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

**Examples** This example shows the sample output of the **show ikev2 summary** command:

```
Router# show ikev2 summary
IKEv2 Session Summary
-----
Total Sa (Active/Negotiation)      : 2 (1/1)
Total Outgoing Sa (Active/Negotiation): 2 (1/1)
Total Incoming Sa (Active/Negotiation): 0 (0/0)
```

# show ipsec sa

To display the Security Association (SA) details of the interfaces used for IPSec in the router, use the **show ipsec sa** command in the XR EXEC mode.

```
show ipsec sa [ interface name ]
```

<b>Syntax Description</b>	<b>interface</b> Specifies that an interface name follows				
	<b>name</b> Specifies the name of the interface for which the displays the IPSec Security-Association (SA)				
<b>Command Default</b>	None				
<b>Command Modes</b>	XR EXEC mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.8.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.8.1	This command was introduced.
Release	Modification				
Release 7.8.1	This command was introduced.				

**Usage Guidelines** No specific guidelines impact the use of this command.

## Examples

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

```
Router# show ipsec sa
If/name          SA-Id    Inbound SPI    Outbound SPI
-----
tunnel-ipl       804      0x2c378849     0xa9ed8828

Router# show ipsec sa interface tunnel-ipl
-----
Interface Name   : tunnel-ipl
Interface handle : 0x800090
SA id            : 713
Mode             : Tunnel
-----
Inbound SA
SPI              : 0xab487871
Protocol         : ESP
Encrypt Algorithm : ESP_192_AES
Auth Algorithm   : HMAC_SHA_256
Rekey (After Seconds) : 37
-----
Outbound SA
SPI              : 0x1488529e
Protocol         : ESP
Encrypt Algorithm : ESP_192_AES
Auth Algorithm   : HMAC_SHA_256
Rekey (After Seconds): 37
```

```
show ipsec sa
```