



List of Commands

This guide describes the commands supported in NCS 1004.

- [aaa authentication login](#), on page 3
- [aaa authorization](#), on page 4
- [aaa authorization \(System Admin-VM\)](#), on page 5
- [active](#), on page 6
- [address](#), on page 6
- [ains-soak \(OTN-XP Card\)](#), on page 7
- [automatic-in-service \(OTN-XP Card\)](#), on page 8
- [authentication](#), on page 9
- [cipher-suite](#), on page 10
- [controller coherentDSP](#), on page 10
- [controller HundredGigECtrlr](#), on page 14
- [controller FourHundredGigECtrlr](#), on page 15
- [controller TenGigECtrlr \(OTN-XP Card\)](#), on page 17
- [controller odu2e \(OTN-XP Card\)](#), on page 18
- [controller ODU4](#), on page 19
- [controller OTU \(OTN-XP Card\)](#), on page 20
- [controller optics](#), on page 21
- [destination address](#), on page 25
- [destination ipv4 unicast](#), on page 26
- [destination transport-method](#), on page 26
- [dh](#), on page 27
- [dwdm-carrier](#), on page 28
- [encryption](#), on page 29
- [fault-profile](#), on page 30
- [fault-profile apply](#), on page 31
- [gmpls optical-uni](#), on page 31
- [http-proxy](#), on page 32
- [hw-module](#), on page 33
- [hw-module \(OTN-XP Card\)](#), on page 36
- [ikev2 policy](#), on page 37
- [ikev2 profile](#), on page 38
- [ikev2 proposal](#), on page 39

- integrity, on page 40
- interface gcc0, on page 41
- interface gcc2, on page 42
- ipcc routed, on page 43
- ipv4 access-group, on page 44
- ipv6 access-group, on page 45
- keyring, on page 45
- lc-module (OTN-XP Card), on page 46
- license smart register, on page 47
- license smart renew , on page 48
- license smart deregister, on page 49
- lifetime, on page 49
- link-id ipv4 unicast, on page 50
- lmp, on page 51
- match address local, on page 51
- match identity remote address, on page 52
- neighbor interface-id unnumbered, on page 53
- neighbor link-id ipv4 unicast, on page 54
- neighbor, on page 54
- otnsec policy, on page 55
- path-option, on page 56
- peer, on page 57
- pki trustpoint, on page 57
- pm, on page 58
- pre-shared-key, on page 63
- prf, on page 64
- router-id ipv4 unicast, on page 65
- sak-rekey-interval, on page 66
- security-policy, on page 66
- session-id, on page 67
- show alarms, on page 68
- show controllers, on page 69
- show access-lists ipv4, on page 85
- show access-lists ipv6, on page 86
- show environment, on page 87
- show hw-module, on page 90
- show inventory, on page 93
- show led, on page 100
- show platform, on page 101
- signalling refresh out-of-band interval, on page 103
- signalling refresh out-of-band missed, on page 103
- tunnel-id, on page 104
- tunnel-properties, on page 105

aaa authentication login

To configure authentication, authorization, and accounting (AAA) authentication at login, use the **aaa authentication login** command in global configuration mode.

aaa authentication login { default | list-name } method-list

Syntax Description	login	Sets authentication for login.
	default	Uses the listed authentication methods that follow this keyword as the default list of methods for authentication.
	<i>list-name</i>	Character string used to name the authentication method list.
	<i>method-list</i>	Method used to enable AAA system accounting. Method list types are entered in the preferred sequence. The value is one of the following options:
		• group tacacs+ — Specifies a method list that uses the list of all configured TACACS+ servers for authentication. • group radius — Specifies a method list that uses the list of all configured RADIUS servers for authentication. • group named-group — Specifies a named subset of TACACS+ or RADIUS servers for authentication. • local — Specifies a local username or password database for authentication. • line — Specifies a line password or user group for authentication.
Command Default	No authentication is performed.	
Command Modes	Global configuration	
Command History	Release	Modification
	R7.0.1	This command was introduced.

Example

The following example shows how to specify the default method list for authentication, and also enable authentication.

```
configure
aaa authentication login default group tacacs+
exit
commit
```

aaa authorization

To create a method list for authorization, use the **aaa authorization** command in global configuration mode.

```
aaa authorization {exec | nacm} { default | list-name } {none | local | group tacacs+ | group radius |
group group-name }
```

Syntax Description		
exec		Configures authorization for an interactive (EXEC) session.
nacm		Enables the NACM (NETCONF Access Control Model) functionality.
default		Uses the listed authorization methods that follow this keyword as the default list of methods for authorization.
<i>list-name</i>		Character string used to name the list of authorization methods.
none		Uses no authorization. If you specify none , no subsequent authorization method is attempted.
local		Uses local authorization. This method of authorization is not available for command authorization.
group tacacs+		Uses the list of all configured TACACS+ servers for authorization.
group radius		Uses the list of all configured RADIUS servers for authorization. This method of authorization is not available for command authorization.
group <i>group-name</i>		Specifies a named subset of TACACS+ or RADIUS servers for authorization.
Command Default	Authorization is disabled for all actions (equivalent to the method none keyword).	
Command Modes	Global configuration	
Command History	Release	Modification
	R7.0.1	This command was introduced.

Example

The following example shows how to define the network authorization method list named listname1, which specifies that TACACS+ authorization is used.

```
configure
aaa authorization exec listname1 group tacacs+
exit
commit
```

aaa authorization (System Admin-VM)

To create command rules and data rules for user authorization, use the **aaa authorization** command in System Admin Config mode. To delete the command rules and data rules, use the **no** form of this command.

```
aaa authorization { cmdrules cmdrule { integer | range integer } [{ action action-type |
command cmd-name | context context-name | group group-name | ops ops-type }] | commands
group { none | tacacs } | datarules datarule { integer | range integer } [{ action action-type
| context context-name | group group-name | keypath keypath-name | namespace namespace-string
| ops ops-type }] }
```

Syntax Description		
	cmdrules	Configures command rules.
	cmdrule <i>integer</i>	Specifies the command rule number.
	range <i>integer</i>	Specifies the range of the command rules or data rules to be configured.
	action <i>action-type</i>	Specifies whether users are permitted or not allowed to perform the operation specified for the action-type keyword. The action-type specifies the action type for the command rule or data rule. Available options are: accept , accept_log and reject .
	command <i>cmd-name</i>	Specifies the command to which the command rule applies. The command must be entered within double-quotes. Example, get .
	context <i>context-name</i>	Specifies to which type of connection the command rule or data rule applies. The connection type can be netconf, cli, or xml.
	group <i>group-name</i>	Specifies the group to which the command rule or data rule applies. Example, admin-r .
	ops <i>ops-type</i>	Specifies whether the user has read, execute, or read and execute permissions for the command. Available options for command rules are: r , rx , and x . To know the available options for data rules, use a ? after the ops keyword.
	commands group	Sets the command authorization lists for server groups. Available options are none that specifies no authorization and tacacs that specifies use of the list of all tacacs+ hosts.
Command Default	None	
Command Modes	System Admin Config mode	

Command History	Release	Modification
	Release 7.3.2	This command was introduced.

This example shows how to create a command rule:

```
Router#admin
sysadmin-vm:0_RP0#configure
sysadmin-vm:0_RP0(config)#aaa authorization cmdrules cmdrule 6
sysadmin-vm:0_RP0(config-cmdrule-6)#context netconf
sysadmin-vm:0_RP0(config-cmdrule-6)#command get
sysadmin-vm:0_RP0(config-cmdrule-6)#group admin-r
sysadmin-vm:0_RP0(config-cmdrule-6)#ops rx
sysadmin-vm:0_RP0(config-cmdrule-6)#action accept
sysadmin-vm:0_RP0(config)#commit
```

active

To enable a Call Home profile, use the **active** command in the call home profile configuration mode.

active

Syntax Description	This command has no keywords or arguments.	
Command Default	None	
Command Modes	Call home profile configuration mode	
Command History	Release	Modification
	Release 7.0.1	This command was introduced.

Usage Guidelines You must enable a profile using the **active** command so that call home messages can be triggered.

The following example shows how to activate a profile.

```
domain name-server 64.102.6.247
call-home
service active
contact smart-licensing
profile CiscoTAC-1
active
```

address

To configure the IP address of the peer node during keyring configuration, use the **address** command in keyring configuration mode.

```
address { ipv4-address [ subnet-mask] }
```

Syntax Description	<i>ipv4-address</i>	IP address of the peer node.
	<i>subnet-mask</i>	Subnet mask address.
Command Default	None	
Command Modes	Keyring configuration	
Command History	Release	Modification
	Release 7.0.1	This command was introduced.

Example

The following is a sample in which an OTNSec policy is configured.

```
RP/0/RP0/CPU0:ios#conf
Thu Mar  7 19:33:14.594 UTC
RP/0/RP0/CPU0:ios(config)#keyring kyr1
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#peer peer1
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#address 10.0.0.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#pre-shared-key key1|clear
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#commit
Thu Mar  7 19:54:33.314 UTC
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#exit
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show keyring kyr1
Thu Mar  7 19:58:07.135 UTC
```

```
Keyring Name                               : kyr1
=====
Total Peers                               : 1
-----
Peer Name                                 : peer1
IP Address                               : 10.0.0.1
Subnet Mask                              : 255.255.255.0
Local PSK                                : Configured
Remote PSK                               : Configured
```

ains-soak (OTN-XP Card)

To configure the default AINS settings for all controllers on the OTN-XP card, use the **ains-soak** command in the IOS XR configuration mode. The configuration is applied to any OTN-XP line card that is installed in the Cisco NCS 1004.

```
ains-soak hours hours minutes minutes
```

Syntax Description	ains-soak hours <i>hours</i> minutes <i>minutes</i>	Specifies the AINS configuration in hours and minutes.				
Command Default	None					
Command Modes	Cisco IOS XR Configuration					
Command History	<table><tr><th>Release</th><th>Modification</th></tr><tr><td>Release 7.2.1</td><td>This command was introduced.</td></tr></table>	Release	Modification	Release 7.2.1	This command was introduced.	
Release	Modification					
Release 7.2.1	This command was introduced.					

Example

The following is a sample in which all the controllers on the OTN-XP card are configured with AINS with soak time period specified to be two minutes.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#ains-soak hours 0 minutes 2
RP/0/RP0/CPU0:ios(config)#commit
```

automatic-in-service (OTN-XP Card)

To override the default AINS settings on a specific controller on the OTN-XP card, use the **automatic-in-service** command.



Note

This configuration does not persist after a RP reload operation.

automatic-in-service controller optics <i>R/S/I/P</i> hours <i>hours</i> minutes <i>minutes</i>					
Syntax Description	<table> <tr> <td><i>R/S/I/P</i></td><td>Rack/Slot/Instance/Port of the optics controller.</td></tr> <tr> <td><i>hours</i> minutes <i>minutes</i></td><td>Specifies the AINS configuration in hours and minutes.</td></tr> </table>	<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the optics controller.	<i>hours</i> minutes <i>minutes</i>	Specifies the AINS configuration in hours and minutes.
<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the optics controller.				
<i>hours</i> minutes <i>minutes</i>	Specifies the AINS configuration in hours and minutes.				
Command Default	None				
Command Modes	None				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.2.1</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 7.2.1	This command was introduced.
Release	Modification				
Release 7.2.1	This command was introduced.				

Example

The following is a sample in which the optics controller on the OTN-XP card is configured with a soak time period of 45 minutes.

```
RP/0/RP0/CPU0:ios#automatic-in-service controller optics 0/1/0/0 hours 0 minutes 45
```

authentication

To configure the local or remote authentication method for the IKEv2 profile, use the **authentication** command in IKEv2 profile configuration mode.



Note You can specify only one local authentication method but multiple remote authentication methods.

authentication {local pre-share | rsa-signature} {remote pre-share | rsa-signature}

Syntax Description

pre-share	Specifies the preshared key as the authentication method.
rsa-signature	Specifies RSA signature as the authentication method.

Command Default

None

Command Modes

IKEv2 profile configuration

Command History

Release	Modification
---------	--------------

R7.2.1	This command was introduced.
--------	------------------------------

Example

The following example shows how to specify the authentication mode in the IKEv2 profile.

```
RP/0/RP0/CPU0:ios#configure
Thu May 7 16:22:33.804 IST
RP/0/RP0/CPU0:ios(config)#ikev2 profile IP1
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#match identity remote address 1.1.1.2
255.255.255.255
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#pki trustpoint myca
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#lifetime 120
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#authentication local rsa-signature
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#authentication remote rsa-signature
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#commit
```

cipher-suite

To specify the encryption algorithm for an OTNSec policy, use the **cipher-suite** command in the OTNSec policy configuration mode.

cipher-suite *encryption-algorithm-type*

Syntax Description	<i>encryption-algorithm-type</i> Encryption algorithm type. AES-GCM-256 is used.				
Command Default	None				
Command Modes	OTNSec policy configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command was introduced.
Release	Modification				
Release 7.0.1	This command was introduced.				

Example

The following is a sample in which an OTNSec policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 11 15:16:58.417 UTC
RP/0/RP0/CPU0:ios(config)#otnsec policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec-policy)#cipher-suite AES-GCM-256
RP/0/RP0/CPU0:ios(config-otnsec-policy)#security-policy must-secure
RP/0/RP0/CPU0:ios(config-otnsec-policy)#sak-rekey-interval 120
RP/0/RP0/CPU0:ios(config-otnsec-policy)#commit
```

The following is a sample of an OTNSec policy.

```
RP/0/RP0/CPU0:ios#show run otnsec policy otnsec-policy1
Tue Mar 12 11:14:03.591 UTC
otnsec policy otnsec-policy1
cipher-suite AES-GCM-256
security-policy must-secure
sak-rekey-interval 120
!
```

controller coherentDSP

To configure the coherent DSP controller, use the **controller coherentDSP** command in the Coherent DSP controller configuration mode.

controller coherentDSP *R/S/I/P* [**description**] | [**fec** *fec-value*] | [**pm** { **30-sec** | **15-min** | **24-hour** } { **fec** | **otn** } { **report** | **threshold** } *value*] | [**perf-mon** { **enable** | **disable** }] | [**loopback** *internal*] | [**secondary-admin-state** { **maintenance** | **normal** }] | [

```
shutdown ] | [ tti { sent | expected } { ascii | hex } tti-string ] [ gcc0 ] [ flexo { gid gid-no
| iid iid-no } ]
```

Syntax Description

<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the coherent DSP controller.
description <i>description</i>	Description of the coherent DSP controller.
fec <i>fec-value</i>	Configures the FEC on the controller. The supported options on the 1.2T line card are StandardSD15 and StandardSD27. From Release 7.2.1 onwards, the supported options on the OTN XP card are EnhancedSD15 and EnhancedSD27. From Release 7.3.1 onwards, OFEC is supported on the OTN XP card.
pm { 30-sec 15-min 24-hour } { fec otn } { report threshold } <i>value</i>	Configures performance monitoring parameters for 30 second, 15 minute, or 24-hour intervals. The fec keyword configures FEC PM data in 30 second, 15 minute, or 24-hour intervals. The otn keyword configures OTN PM data in 30 second, 15 minute, or 24-hour intervals. The report keyword configures TCA reporting status. The threshold keyword configures threshold values on PM parameters.
perf-mon { enable disable }	Enables or disables performance monitoring.
loopback internal	Configures the internal loopback mode on the controller. For the 1.2T line card, internal and line loopbacks are supported on the Ethernet controllers whereas only internal loopback is supported on the CoherentDSP controllers.
secondary-admin-state	Configures the administrative state of the controller. The values are maintenance or normal.
shutdown	Disables the configuration of the controller.
tti sent { ascii hex } <i>tti-string</i>	Configures the Trail Trace Identifier (TTI) ASCII or hex string to be sent. From Release 7.3.2 onwards, TTI strings such as SAPI, DAPI, and operator inputs are supported.
tti expected { ascii hex } <i>tti-string</i>	Configures the expected TTI ASCII or hex string. The OTUK-TIM alarm is raised if the received TTI string does not match the expected TTI string. From Release 7.3.2 onwards, TTI strings such as SAPI, DAPI, and operator inputs are supported.
gcc0	Enables the GCC0 interface.
flexo { gid <i>gid-no</i> iid <i>iid-no</i> }]	Configures FlexO group identification (GID) and FlexO instance identification (IID) on the controller. The range of the gid <i>gid-no</i> is 1–1,048,576. The range of the iid <i>iid-no</i> is 1–254.

Command Default	None	
Command Modes	Coherent DSP controller configuration	
Command History	Release	Modification
	Release 7.0.1	This command was introduced.
	Release 7.1.1	gcc0 keyword was added.
	Release 7.2.1	The following FEC options for the OTN-XP card were added. • EnhancedSD15 • EnhancedSD27
	Release 7.3.1	The following FEC options for the OTN-XP card were added. • OFEC
	Release 7.3.1	The flexo { gidgid-no iidiid-no }] keyword and options were added.
	Release 7.3.2	TTI strings such as SAPI, DAPI, and operator inputs were supported.

Example

The following is a sample in which performance monitoring parameters of Coherent DSP controller is configured in 30-second intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/1/1 pm 30-sec fec threshold post-fec-ber
max OE-15
RP/0/RP0/CPU0:ios(config)#commit
```

The following example shows how to configure TTI on a coherentDSP controller with the sent and expected strings set to the same ASCII string. The state of the controller is up.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/1/0/1 tti sent ascii 1234
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/1/0/1 tti expected ascii 1234
RP/0/RP0/CPU0:ios(config)#commit
```

The following example shows how to configure TTI on a coherentDSP controller with the sent and expected strings set to different ASCII strings. The state of the controller goes down and the OTUK-TIM alarm is raised.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/1/0/1 tti sent ascii 1234
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/1/0/1 tti expected ascii 5678
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample to enable the GCC0 interface.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller CoherentDSP0/0/0/0
RP/0/RP0/CPU0:ios(config-CoDSP)#gcc0
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
RP/0/RP0/CPU0:ios(config-CoDSP)#exit
```

The following is a sample to configure FEC with the EnhancedSD15 option on the CoherentDSP controller of the OTN-XP card:

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/0/0
RP/0/RP0/CPU0:ios(config-CoDSP)#fec EnhancedSD15
Tue Feb 25 11:25:52.670 UTC
WARNING! Changing FEC mode can impact traffic
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
```

The following is a sample to configure with the O-FEC option on the CoherentDSP controller of the OTN-XP card:

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/0/0
RP/0/RP0/CPU0:ios(config-CoDSP)#fec OFEC
Tue Feb 25 11:25:52.670 UTC
WARNING! Changing FEC mode can impact traffic
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
```

The following is a sample to configure flexO GID and IID on the CoherentDSP controller of the OTN-XP card:

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP0/2/0/12
RP/0/RP0/CPU0:ios(config-CoDSP)#flexo
RP/0/RP0/CPU0:ios(config-CoDSP)#gid 2 iid 5,6,7,8
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
```

The following sample displays how to configure loopback on a coherent DSP controller ports on the OTN-XP in inverse muxponder configuration mode.

```
Thu Sep 30 14:16:04.678 UTC
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/2/0/12
RP/0/RP0/CPU0:ios(config-CoDSP)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-CoDSP)#loopback internal
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
Thu Sep 30 14:16:19.594 UTC
RP/0/RP0/CPU0:ios(config-CoDSP)#controller coherentDSP 0/2/0/13
RP/0/RP0/CPU0:ios(config-CoDSP)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-CoDSP)#loopback internal
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
```

The following sample displays how to configure TTI on a coherent DSP controller port 12 on the OTN-XP in inverse muxponder configuration mode.

```
RP/0/RP0/CPU0:ios#configure
Thu Sep 30 14:18:13.288 UTC
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/2/0/12
RP/0/RP0/CPU0:ios(config-CoDSP)#tti sent sapi ascii cisco
RP/0/RP0/CPU0:ios(config-CoDSP)#commit
```

controller HundredGigECtrlr

To configure the Ethernet controller, use the **controller HundredGigECtrlr** command in the Ethernet controller configuration mode.

```
controller HundredGigECtrlr R/S/I/P [ pm {30-sec|15-min|24-hour} {ether} {report|threshold}
value ] | [ perf-mon disable ] | [ loopback {internal | line} ] | [ sec-admin-state
maintenance ] | [ shutdown ] | [ laser-squelch ] | [ fec { none | standard } ] |
[ holdoff-time trunk-fault timevalue ]
```

Syntax Description	R/S/I/P	Rack/Slot/Instance/Port of the Ethernet controller.
pm { 30-sec 15-min 24-hour }		Configures performance monitoring parameters for 30 second, 15 minutes, or 24 hour intervals.
ether		Configures Ethernet PM data in 30 second, 15 minute or 24 hour intervals.
report		Configures TCA reporting status.
threshold		Configures threshold on Ethernet controller parameters.
perf-mon disable		Disables performance monitoring.
loopback [internal line]		Configures the internal or line loopback mode on the Ethernet controller. For the 1.2T line card, internal and line loopbacks are supported on the ethernet controllers whereas only internal loopbacks are supported on the CoherentDSP controllers.
sec-admin-state maintenance		Configures the administrative state of the controller indicating that the controller is under maintenance.
shutdown		Disables the configuration of the controller.
laser-squelch		Enables laser squelching so that laser is brought down in the event of trunk faults (LOF, LOS) and a SQUELCHED alarm is raised.
fec { none standard }		Disables FEC or enables standard (Reed-Solomon) FEC.
holdoff-time trunk-fault timevalue		When a fault occurs on the trunk port, the user can hold the propagation of Local Fault using this parameter. The range of timevalue is 0 to 3000 ms.

Command Default None

Command Modes Ethernet controller configuration

Command History	Release	Modification
	Release 7.0.1	This command was introduced.

Example

The following example shows how to configure the performance monitoring parameters of the Ethernet controller in 15 minute intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 pm 15-min pcs report bip
enable
```

The following example shows how to configure the internal loopback.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 secondary-admin-state
maintenance
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 loopback internal
RP/0/RP0/CPU0:ios(config)#commit
```

The following example enables IDLE hold off timer in Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 holdoff-time trunk-fault
3000
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample where laser quelching is enabled on the Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 laser-squelch
RP/0/RP0/CPU0:ios(config)#commit
```

controller FourHundredGigECtrlr

To configure the Ethernet controller, use the **controller FourHundredGigECtrlr** command in the Ethernet controller configuration mode.

```
controller FourHundredGigECtrlr R/S/I/P [ pm { 30-sec | 15-min | 24-hour } { ether } { report
| threshold } value ] | [ perf-mon disable ] | [ loopback { internal | line } ] | [
sec-admin-state maintenance ] | [ shutdown ] | [ laser-squelch ] | [ fec { none |
standard } ] | [ holdoff-time trunk-fault timevalue ]
```

Syntax Description	<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the Ethernet controller.
	pm { 30-sec 15-min 24-hour }	Configures performance monitoring parameters for 30 second, 15 minutes, or 24 hour intervals.
	ether	Configures Ethernet PM data in 30 second, 15 minute or 24 hour intervals.
	report	Configures TCA reporting status.
	threshold	Configures threshold on Ethernet controller parameters.
	perf-mon disable	Disables performance monitoring.

loopback [internal line]	Configures the internal or line loopback mode on the Ethernet controller. For the 1.2T line card, internal and line loopbacks are supported on the ethernet controllers whereas only internal loopbacks are supported on the CoherentDSP controllers.
sec-admin-state maintenance	Configures the administrative state of the controller indicating that the controller is under maintenance.
shutdown	Disables the configuration of the controller.
laser-squelch	Enables laser squelching so that laser is brought down in the event of trunk faults (LOF, LOS) and a SQUELCHED alarm is raised.
fec { none standard }	Disables FEC or enables standard (Reed-Solomon) FEC.
holdoff-time trunk-fault timevalue	When a fault occurs on the trunk port, the user can hold the propagation of Local Fault using this parameter. The range of <i>timevalue</i> is 0 to 3000 ms.

Command Default

None

Command Modes

Ethernet controller configuration

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Example

The following example shows how to configure the performance monitoring parameters of the Ethernet controller in 15 minute intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 pm 15-min pcs report bip enable
```

The following example shows how to configure the internal loopback.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 loopback internal
RP/0/RP0/CPU0:ios(config)#commit
```

The following example enables IDLE hold off timer in Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 holdoff-time trunk-fault 3000
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample where laser squelching is enabled on the Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigECtrlr 0/1/0/10 laser-squelch
RP/0/RP0/CPU0:ios(config)#commit
```

controller TenGigECtrlr (OTN-XP Card)

To configure the Ethernet controller, use the **controller TenGigECtrlr** command in the Ethernet controller configuration mode.

From R7.2.1 onwards, the TenGig Ethernet controller configuration is supported on the OTN-XP card.

```
controller TenGigECtrlr R/S/I/P/L [ pm { 30-sec | 15-min | 24-hour } perf-mon disable ] |
[ loopback { internal | line } ] | [ sec-admin-state maintenance ] | [ shutdown ] | [
laser-squelch ] | [ holdoff-time trunk-fault timevalue ]
```

Syntax Description	<i>R/S/I/P/L</i>	Rack/Slot/Instance/Port/Lane of the Ethernet controller.
	pm { 30-sec 15-min 24-hour }	Configures performance monitoring parameters for 30 second, 15 minutes, or 24 hour intervals.
	perf-mon disable	Disables performance monitoring.
	loopback [internal line]	Configures the internal or line loopback mode on the Ethernet controller.
	sec-admin-state <i>maintenance</i>	Configures the administrative state of the controller indicating that the controller is under maintenance.
	shutdown	Disables the configuration of the controller.
	laser-squelch	Enables laser squelching so that laser is brought down in the event of trunk faults and a SQUELCHED alarm is raised.
	holdoff-time trunk-fault <i>timevalue</i>	When a fault occurs on the trunk port, the user can hold the propagation of Local Fault using this parameter. The range of <i>timevalue</i> is 0 to 3000 ms.

Command Default None

Command Modes Ethernet controller configuration

Command History	Release	Modification
	Release 7.2.1	This command was introduced.

Examples

The following example shows how to configure the internal loopback.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller TenGigEctrlr 0/0/0/4/1secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config)#controller TenGigEctrlr 0/0/0/4/1 loopback internal
RP/0/RP0/CPU0:ios(config)#commit
```

The following example enables IDLE hold off timer in Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller TenGigEctrlr 0/0/0/4/1 holdoff-time trunk-fault 3000
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample where laser quelching is enabled on the Ethernet controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller TenGigEctrlr 0/0/0/4/1 laser-squelch
RP/0/RP0/CPU0:ios(config)#commit
```

controller odu2e (OTN-XP Card)

To configure the ODU2e controller, use the **controller odu2e** command in the configuration mode.

From R7.2.1 onwards, the PBRS mode configuration is supported on the ODU2e controller on OTN-XP card.

controller Odu2e *R/S/I/P/C/L* **opu** **prbs mode** { **source** | **sink** | **source-sink** } **pattern invertedpn31**

Syntax Description	<i>R/S/I/P/C/L</i>	Rack/Slot/Instance/Port/Client-port/Lane-number of the ODU2e controller.
	opu	Configures Optical Channel Payload Unit (OPU) on the ODU2e controller.
	prbs mode { source sink source-sink }	Configures Pseudo Random Binary Sequence (PRBS) mode as source, sink, or source sink.
	patterninvertedpn31	Configures PRBS pattern as inverted pattern. Sequence length is from 2^31 -1 bits.
Command Default	None	
Command Modes	Configuration	
Command History	Release	Modification
	Release 7.2.1	This command was introduced.

Example

The following is a sample in which PRBS mode is configured as source with pattern as invertedpn31.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller odu2e 0/0/0/0/4/1
RP/0/RP0/CPU0:ios(config-odu2e)#opu
RP/0/RP0/CPU0:ios(config-Opuk)#prbs mode source pattern invertedpn31
RP/0/RP0/CPU0:ios(config-Opuk)#commit
```

controller ODU4

To configure the ODU4 controller, use the **controller ODU4** command in the configuration mode.

controller ODU4 *R/S/I/P* **gcc2**

Syntax Description	<i>R/S/I/P/L</i> Rack/Slot/Instance/Port/Lane of the ODU4 controller.
	gcc2 Enables the GCC2 interface.
Command Default	None
Command Modes	Configuration
Command History	Release Modification
	Release 7.0.1 This command is introduced.
	Release 7.1.1 gcc2 keyword was added.

Example

The following is a sample in which OTNSec is configured on ODU4 controllers.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 12 12:10:21.374 UTC
RP/0/RP0/CPU0:ios(config)#controller ODU4 0/1/0/0/1
RP/0/RP0/CPU0:ios(config-odu4)#otnsec
RP/0/RP0/CPU0:ios(config-otnsec)#source ipv4 10.0.0.1
RP/0/RP0/CPU0:ios(config-otnsec)#destination ipv4 10.0.0.2
RP/0/RP0/CPU0:ios(config-otnsec)#session-id 9000
RP/0/RP0/CPU0:ios(config-otnsec)#policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec)#ikev2 profile1
RP/0/RP0/CPU0:ios(config-otnsec)#commit
Mon Mar 12 12:14:17.609 UTC
RP/0/RP0/CPU0:ios(config-otnsec)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

The following is a running configuration on an ODU4 controller.

```
RP/0/RP0/CPU0:ios#show run controller ODU4 0/1/0/0/1
Tue Mar 12 12:20:49.153 UTC
controller ODU40/1/0/0/1
  gcc2
```

```

otnsec
policy otnsec-policy1
source ipv4 10.0.0.1
destination ipv4 10.0.0.2
session-id 9000
!
!

```

The following is a sample to enable the GCC2 interface.

```

RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller odu4 0/1/0/0/1
RP/0/RP0/CPU0:ios(config-odu4)#gcc2
RP/0/RP0/CPU0:ios(config-odu4)#commit
RP/0/RP0/CPU0:ios(config-odu4)#exit

```

controller OTU (OTN-XP Card)

To configure the OTU controller, use the **controller OTU** command in the configuration mode.

From R7.2.1 onwards, you can configure loopback on the OTU2, OTU2e, and OTU4 controllers on OTN-XP card.

controller { **otu2** | **otu2e** | **otu4** } *R/S/I/P/L* **sec-admin-state** **loopback** [**internal** | **line**]

Syntax Description	<i>R/S/I/P/L</i>	Rack/Slot/Instance/Port/Lanenumbr of the OTU2, OTU2e, and OTU4 controller. The range of <i>Lanenumbr</i> is from 1 to 4.
	sec-admin-state	Configures the administrative state of the controller .
	loopback [internal line]	Configures the internal or line loopback mode on the OTU2, OTU2e, and OTU4 controller.
Command Default	None	
Command Modes	Configuration	
Command History	Release	Modification
	Release 7.2.1	This command was introduced.

Examples

The following is a sample in which the line loopback is configured on the OTU2e controller.

```

RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller otu2e 0/0/0/11/3
RP/0/RP0/CPU0:ios(config-otu2e)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-otu2e)#loopback line
RP/0/RP0/CPU0:ios(config-otu2e)#commit

```

```
Thu Apr 23 10:55:19.319 UTC
RP/0/RP0/CPU0:ios(config-otu2e)#end
```

The following is a sample in which the internal loopback is configured on the OTU2 controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller otu2 0/0/0/5/1
RP/0/RP0/CPU0:ios(config-otu2)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-otu2)#loopback internal
RP/0/RP0/CPU0:ios(config-otu2)#commit
Thu Apr 23 11:01:00.562 UTC
RP/0/RP0/CPU0:ios(config-otu2)#end
```

The following is a sample in which the internal loopback is configured on the OTU4 controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller otu4 0/0/0/0
RP/0/RP0/CPU0:ios(config-otu4)#secondary-admin-state maintenance
RP/0/RP0/CPU0:ios(config-otu4)#loopback internal
RP/0/RP0/CPU0:ios(config-otu4)#commit
Thu Apr 23 11:05:22.429 UTC
RP/0/RP0/CPU0:ios(config-otu4)#end
```

controller optics

To configure the optics controller, use the **controller optics** command in the optics controller configuration mode.

```
controller optics R/S/I/P [ baud-rate rate ] [ bits-per-symbol value ] [ cd-max cd-max
| cd-min cd-min | cd-low-threshold cd-low | cd-high-threshold cd-high |
dgd-high-threshold dgd-value | lbc-high-threshold lbc-value | osnr-low-threshold osnr-value
description description | rx-high-threshold rx-high | rx-low-threshold rx-low |
tx-high-threshold tx-high | tx-low-threshold tx-low | sec-admin-state {maintenance | normal}
| shutdown | transmit-power transmit-power | transmit-shutdown | perf-mon { enable
| disable } | pm { 30-sec | 15-min | 24-hour } | optics { report | threshold { cd |
dgd | lbc | lbc-pc | opr | opt | osnr | pcr | pdl | pn | sopmd | rx-sig-pow
| rx-sig-pow-dbm } } ] [ fastpoll { enable | disable } ]
```

To configure the sub-sea parameters for the optics controller, use the following command:

```
controller optics R/S/I/P [ filter-roll-off-factor value | filter-roll-off-factor value | rx-voa
target-power value | rx-voa fixed-ratio value | enh-colorless-mode value | enh-sop-tol-mode
value | nleq-comp-mode value | cross-pol-gain-mode value | cross-pol-weight-mode value |
cpr-win-mode value | cpr-ext-win-mode value | submarine-params type value ]
```

Syntax	Description
<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the optics controller.
baud-rate <i>rate</i>	Sets baud-rate for this controller in GBd.
bits-per-symbol <i>value</i>	Sets bits-per-symbol for this controller.
cd-max <i>cd-max</i>	(Only for trunk optics controllers) Maximum chromatic dispersion. The range is –350000 to +350000 ps/nm.

cd-min <i>cd-min</i>	(Only for trunk optics controllers) Minimum chromatic dispersion. The range is –350000 to +350000 ps/nm.
cd-low-threshold <i>cd-low</i>	(Only for trunk optics controllers) Minimum acceptable chromatic dispersion. The CD alarm is raised if the chromatic dispersion goes below this value. The range is –350000 to +350000 ps/nm.
cd-high-threshold <i>cd-high</i>	(Only for trunk optics controllers) Maximum acceptable chromatic dispersion. The CD alarm is raised if the chromatic dispersion exceeds this value. The range is –350000 to +350000 ps/nm.
dgd-high-threshold <i>dgd-value</i>	(Only for trunk optics controllers) Configures the maximum acceptable Differential Group Delay (DGD) value. The DGD alarm is raised if DGD exceeds this value. The range is 0–18000 (in the units of 0.01 ps).
lbc-high-threshold <i>lbc-value</i>	Configures the high laser bias current threshold. The range is 0 to 100%.
osnr-low-threshold <i>osnr-value</i>	(Only for trunk optics controllers) Configures the minimum acceptable Optical Signal to Noise ratio (OSNR) value. The OSNR alarm is raised if OSNR goes below this value. The range is 0–4000 (in units of 0.01db).
description <i>description</i>	Description of the optics controller.
rx-high-threshold <i>rx-high</i>	Configures high receive power threshold. The range is –400 to 300 (in the units of 0.1 dBm).
rx-low-threshold <i>rx-low</i>	Configures low receive power threshold. The range is –400 to 300 (in the units of 0.1 dBm).
tx-high-threshold <i>tx-high</i>	Configures high transmit power threshold. The range is –400 to 300 dBm (in the units of 0.1 dBm).
tx-low-threshold <i>tx-low</i>	Configures low transmit power threshold. The range is –400 to 300 dBm (in the units of 0.1 dBm).
sec-admin-state	Configures the administrative state of the controller. The values are maintenance or normal.
shutdown	Disables the configuration of the controller.
pm	Configures performance monitoring parameters for 30 second, 15 minute, and 24-hour intervals.

transmit-power <i>transmit-power</i>	(Only for trunk optics controllers) Configures the transmit power. The range is –190 to 30 dBm (in the units of 0.1 dBm). From Release 7.3.1 onwards, transmit power is supported on the CFP2 DCO optics for the OTN-XP card. The transmit power value is –10 to +1 dBm.
transmit-shutdown	Shuts down the transmit laser.
perf-mon { enable disable }	Enables or disables performance monitoring.
cd	Configures the chromatic dispersion threshold.
dgd	Configures the differential group delay threshold.
lbc	Configures the laser bias current threshold.
lbc-pc	Configures the laser bias current threshold in percentage.
opr	Configures the optical Rx power threshold in uW.
opt	Configures the optical Tx power threshold in uW.
osnr	Configures the OSNR threshold.
pcr	Configures the Polarization Change Rate (PCR) threshold.
pdl	Configures the Polarization-Dependent Loss (PDL) threshold.
pn	Configures the Phase Noise (PN) threshold.
sopmd	Configures the Second Order Polarization Mode Dispersion (SOPMD) threshold.
rx-sig-pow	Configures the Rx signal power threshold in uW.
rx-sig-pow-dbm	Configures the Rx signal power threshold in dBm. The unit is 0.01 dBm.
filter-roll-off-factor <i>value</i>	Configures the RRC filter roll-off factor. The range is 0 to 1.
rx-voa target-power <i>value</i>	Configures the receive target power. The range is –190 to +30.
rx-voa fixed-ratio <i>value</i>	Configures the receive ratio of optical attenuation. The range is +100 to +1700.
enh-colorless-mode <i>value</i>	Configures the enhanced colorless mode. The range is 1–3.
enh-sop-tol-mode <i>value</i>	Configures the enhanced SOP tolerance mode. The range is 1–3.
nleq-comp-mode <i>value</i>	Configures the non-linear compensation. The range is 1–4.
cross-pol-gain-mode <i>value</i>	Configures the carrier phase recovery cross polarization gain mode. The range is 0–15.

cross-pol-weight-mode <i>value</i>	Configures the carrier phase recovery cross polarization weight mode. The range is 0–15.
cpr-win-mode <i>value</i>	Configures the carrier phase recovery window mode. The range is 1–4.
cpr-ext-win-mode <i>value</i>	Configures the carrier phase recovery extended window mode. The range is 1–9.
submarine-params <i>type value</i>	Configures the proprietary submarine parameters. The range for the type is 1–10 and the range for the value is 1–1000. Note This parameter is for future use.
fastpoll { enable disable }	Enables or disables fast polling of SOP data.

Command Default None

Command History	Release	Modification
	Release 7.0.1	This command was introduced.
	Release 7.3.1	The keyword fastpoll was added.

Command Modes Optics controller configuration

Usage Guidelines The configurations for chromatic dispersion (cd-max, cd-min, cd-low-threshold, and cd-high-threshold) must be performed only after the **hw-module** configuration. These configurations must be removed before the **no hw-module** configuration.

Example

The following example shows how to configure the optics controller and set the high-power threshold at the transmit and receive side.

```
RP/0/RP0/CPU0:ios# configure
RP/0/RP0/CPU0:ios(config)#controller optics 0/0/1/1
RP/0/RP0/CPU0:ios(config-optics)#rx-high-threshold 200
RP/0/RP0/CPU0:ios(config-optics)#tx-high-threshold 300
```

The following example shows how to configure the optics controller and set the ranges for chromatic dispersion.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller optics 0/0/1/1
RP/0/RP0/CPU0:ios(config-optics)#cd-max 10000
RP/0/RP0/CPU0:ios(config-optics)#cd-min 2000
```

The following is a sample in which the performance monitoring parameters of optics controller are configured in 24-hour intervals.

```
RP/0/RP0/CPU0:ios#configure
```

```
RP/0/RP0/CPU0:ios(config)#controller optics 0/0/1/1 pm 24-hour optics threshold osnr max
345
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the fastpoll data is enabled on the optics controller:

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)# [no] controller optics <r/s/i/p> fastpoll enable
```

The following is a sample to configure transmit power on the CFP2 DCO optics for the OTN-XP card:

```
RP/0/RP0/CPU0:ios#configure
Mon Aug 19 19:31:42.115 UTC
RP/0/RP0/CPU0:ios(config)#controller optics 0/1/0/12
RP/0/RP0/CPU0:ios(config-Optics)#transmit-power -1.50
RP/0/RP0/CPU0:ios(config-Optics)#commit
Mon Aug 19 19:35:24.697 UTC
RP/0/RP0/CPU0:ios(config-Optics)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

The following is a sample to configure 8QAM modulation on the 200G muxponder mode for the OTN-XP card:

```
RP/0/RP0/CPU0:ios#configure
Wed Jun 2 17:21:42.115 UTC
RP/0/RP0/CPU0:ios(config)#controller optics 0/1/0/12
RP/0/RP0/CPU0:ios(config-Optics)#bits-per-symbol 3
RP/0/RP0/CPU0:ios(config-Optics)#commit
```

destination address

To specify the destination address for Smart Call Home, use the **destination address** command in the call home profile configuration mode.

destination address *address*

Syntax Description	<i>address</i> Specifies the destination address for Smart Call Home. The format is {http https}://{FQDN}/its/service/oddce/services/DDCEService FQDN must be either Cisco Smart Software Manager FQDN (tools.cisco.com) or Smart Licensing satellite server FQDN.				
Command Default	None				
Command Modes	Call home profile configuration mode				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command was introduced.
Release	Modification				
Release 7.0.1	This command was introduced.				

Usage Guidelines

You must configure the DNS server before setting-up the call-home destination address as FQDN. Use **domain name-server {DNS server IP}** command to configure the DNS server on the device.

The following example shows how to specify the destination address for Smart Call Home.

```
domain name-server 64.102.6.247
call-home
service active
contact smart-licensing
profile CiscoTAC-1
active
destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService
```

destination ipv4 unicast

To specify the destination of a GMPLS UNI tunnel, use the **destination ipv4 unicast** command in GMPLS UNI controller tunnel-properties configuration sub-mode.

destination ipv4 unicast *address*

Syntax Description

address Specifies the tunnel destination (IPv4 address).

Command Default

None

Command Modes

GMPLS UNI controller tunnel-properties configuration

Command History

Release	Modification
Release 7.0.1	This command is introduced.

Example

The following example shows how to specify a tunnel destination (10.10.3.4).

```
RP/0/RP0/CPU0:ios(config)#mpls traffic-eng
RP/0/RP0/CPU0:ios(config-mpls-te)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-te-gmpls)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-te-gmpls-cntl)#tunnel-properties
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#destination 10.10.3.4
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#
```

destination transport-method

To specify the destination transport method for Smart Call Home, use the **destination transport-method** command.

destination transport-method {http|email}

Syntax Description	email Enables an e-mail address for the profile. http Enables an HTTP URL for the profile.				
Command Default	None				
Command Modes	Call home profile configuration mode				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command was introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command was introduced.
Release	Modification				
Release 7.0.1	This command was introduced.				
Usage Guidelines	For the user profile, both e-mail and http can be enabled. For the Cisco TAC profile, only one transport method can be enabled. The following example shows how to specify the destination transport method for Smart Call Home. <pre> domain name-server 64.102.6.247 call-home service active contact smart-licensing profile CiscoTAC-1 active destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService destination transport-method http </pre>				

dh

To specify the Diffie-Hellman group for the IKEv2 proposal, use the **dh** command in IKEv2 proposal configuration mode.

dh *dh-group*

Syntax Description	<i>dh-group</i> DH group identifier. The possible values are 19, 20, and 21.				
Command Default	None				
Command Modes	IKEv2 proposal configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 proposal is configured.

```

RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:19:30.259 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#encryption aes-cbc-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#integrity sha-1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#prf sha-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#dh 20
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#commit
Thu Mar  7 19:20:30.916 UTC
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 proposal proposal1
Thu Mar  7 19:20:48.929 UTC

```

```

Proposal Name           : proposal1
=====
Status                   : Complete
-----
Total Number of Enc. Alg. : 1
    Encr. Alg.           : CBC-AES-256
-----
Total Number of Hash. Alg. : 1
    Hash. Alg.           : SHA 1
-----
Total Number of PRF. Alg. : 1
    PRF. Alg.            : SHA 256
-----
Total Number of DH Group : 1
    DH Group              : Group 20

```

dwdm-carrier

To configure the wavelength on the trunk port, use the **dwdm-carrier** command in optics controller configuration mode. To return the wavelength to its default value, use the **no** form of this command.

dwdm-carrier { **100MHz-grid** *frequency frequency* } | { **50GHz-grid** *frequency frequency* }

Syntax Description	50Ghz-grid 100MHz-grid	Configures the wavelength in 50GHz grid and 100MHz (0.1GHz) grid spacing respectively in accordance with ITU definition.
	frequency frequency	Specifies the frequency for the optics controller.
Command Default	None	
Command Modes	Optics controller configuration	
Command History	Release	Modification
	Release 7.0.1	This command was introduced.
Usage Guidelines	The controller must be in the shutdown state before you can use the wavelength command.	

Example

The following example shows how to configure the frequency in 100MHz grid spacing.

```
RP/0/RP0/CPU0:ios# config
RP/0/RP0/CPU0:ios(config)# controller optics 0/0/0/0
RP/0/0/CPU0:ios(config-optics)# dwdm-carrier 100MHz-grid frequency 1865000
```

encryption

To specify the transform types for encryption, use the **encryption** command in the IKEv2 proposal configuration mode.

encryption *encryption-type*

Syntax Description	<i>encryption-type</i> Encryption algorithm. The possible values are aes-gcm-256, aes-gcm-128, aes-cbc-256, aes-cbc-192, and aes-cbc-128.				
Command Default	None				
Command Modes	IKEv2 proposal configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 proposal is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:19:30.259 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#encryption aes-cbc-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#integrity sha-1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#prf sha-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#dh 20
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#commit
Thu Mar  7 19:20:30.916 UTC
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 proposal proposal1
Thu Mar  7 19:20:48.929 UTC
```

```
Proposal Name           : proposal1
=====
Status                  : Complete
-----
```

```
Total Number of Enc. Alg. : 1
  Encr. Alg.               : CBC-AES-256
```

```

-----
Total Number of Hash. Alg. : 1
      Hash. Alg.           : SHA 1
-----
Total Number of PRF. Alg.  : 1
      PRF. Alg.            : SHA 256
-----
Total Number of DH Group   : 1
      DH Group              : Group 20
-----

```

fault-profile

Use the **fault-profile** command in the global configuration mode, to create a new fault profile with one or more alarms and user-defined severity.

fault-profile *name* **fault-identifier subsystem XR fault-type** { **ethernet** | **sdh_controller** | **sonet** | **OPTICS** | **G709** } **fault-tag** *name* *sas severity* *nsas severity*

Syntax Description

fault-profile <i>name</i>	Name of the fault profile.
fault-identifier subsystem XR	Supports the XR sub-system.
fault-type	The component the fault profile is applicable to. The available options are: • ethernet • sdh_controller • sonet • OPTICS • G709
fault-tag <i>name</i>	The faults that are included as part of the newly created fault profile.
sas severity nsas severity	Sets the severity level for: • sas (service affecting; impacts traffic) • nsas (non-service affecting; does not impact traffic) The available options are: • Critical • Major • Minor • Non-faulted • Non-reported

Command Default	No default behavior or values.	
Command Modes	Global Configuration	
Command History	Release	Modification
	Release 7.1.1	This command was introduced.

Example

The following example shows how to use the **fault profile** command.

```
RP/0/RP0/CPU0: router (config) # fault profile f1 fault-identifier subsystem XR fault-type
HW_OPTICS fault-tag OPTICAL_LO_RXPOWER sas CRITICAL nsas CRITICAL
```

fault-profile apply

Use the **fault-profile apply** command in the global configuration mode, to apply a fault profile at the node level or card level.

fault-profile *name* **apply rack0 slot** *location*

Syntax Description	fault-profile <i>name</i>	Name of the fault profile.
	rack 0 slot <i>location</i>	Sets the profile at the node level or line card level.

Command Default	No default behavior or values.	
Command Modes	Global Configuration	
Command History	Release	Modification
	Release 7.1.1	This command was introduced.

Example

The following example shows how to use the **fault profile apply** command.

```
RP/0/RP0/CPU0:ios (config) # fault profile f1 apply rack 0 slot ALL
```

gmpls optical-uni

To enable GMPLS UNI feature, use the **gmpls optical-uni** command in LMP configuration mode.

gmpls optical-uni

Syntax Description	This command has no keywords or arguments.	
Command Default	None	
Command Modes	LMP configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.
Usage Guidelines	The LMP submode enables GMPLS-UNI LMP functionality and acts as a container for other GMPLS-UNI LMP configuration commands.	

Example

The following example shows how to enable GMPLS UNI and enter LMP configuration mode.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls)#
```

http-proxy

To configure the Call Home HTTP proxy server, use the **http-proxy** command in the call home profile configuration mode.

http-proxy *proxy-server-name* **port** *port-number*

Syntax Description	<i>proxy-server-name</i>	Specifies the name of the proxy server.
	<i>port-number</i>	Specifies the port for the specified HTTP proxy server.
Command Default	None	
Command Modes	Call home profile configuration mode	
Command History	Release	Modification
	Release 7.0.1	This command was introduced.
Usage Guidelines	None	

The following example configures the call home HTTP proxy server :

```
RP/0/RP0/CPU0:ios#configure
```

```
RP/0/RP0/CPU0:ios(config)#call-home
RP/0/RP0/CPU0:ios(config-call-home)#http-proxy aa.bbb.cc.dd port 100
```

hw-module

To configure the card in the module (muxponder), slice configuration (muxponder slice), or regen mode, use the **hw-module** command in IOS XR configuration mode.

```
hw-module location location { mxponder | mxponder-slice mxponder-slice-number } client bitrate
[100GE | OTU4] trunk bitrate [50G | 100G | 150G | 200G | 250G | 300G | 350G | 400G | 450G | 500G
| 550G | 600G] [drop-lldp] [client-port-ains-soak hours hours minutes minutes ]
hw-module location location { regen trunk-rate trunk-rate }
hw-module location location mxponder arp-snoop
```

Syntax Description

location <i>location</i>	Specifies the location of the optics controller.
mxponder	Configures the card in muxponder mode.
mxponder-slice <i>mxponder-slice-number</i>	Configures the card in muxponder slice configuration. Slice numbers can be 0 or 1.
client bitrate [100GE OTU4]	Specifies the traffic rate on the client ports. The supported client rates are 100GE and OTU4.
trunk bitrate [50G 100G 150G 200G 250G 300G 350G 400G 450G 500G 550G 600G]	Specifies the traffic rate on the trunk ports. The supported trunk rates are 150G, 200G, 250G, 300G, 350G, 400G, 450G, 500G, 550G, and 600G. From R7.2.1, you can configure trunk rates of 50G, 100G, and 150G to support Binary Phase-Shift Keying (BPSK) modulation. Note The 150G, 250G, 350G, 450G, and 550G data rates can be configured only in the muxponder card mode.
drop-lldp	Enables LLDP drop on a muxponder or muxponder slice.
client-port-ains-soak hours <i>hours</i> minutes <i>minutes</i>	Specifies the AINS configuration in hours and minutes.

regen trunk-rate <i>trunk-rate</i>	Configures the card in Regen mode. The supported trunk rates are 100G to 600G in multiples of 100G.
---	---

arp-snoop	Configures MAC address or ARP snoop on the client ports.
------------------	--

Command Default

No slice is configured.

You must configure the card mode before enabling LLDP drop.

Command Modes

Cisco IOS XR Configuration

Command History

Release	Modification
Release 7.0.1	This command was introduced.
Release 7.1.1	regen keyword was added.
Release 7.2.1	arp-snoop keyword was added.
Release 7.3.1	trunk bitrate 50G 100G keyword options are introduced.

Example

The following is a sample in which the card is configured in the muxponder mode with 100GE client payload and 500G trunk payload.

```
RP/0/RP0/CPU0:ios#configure
Sun Feb 24 14:09:33.989 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/2 mxponder client-rate 100GE
RP/0/RP0/CPU0:ios(config)#hw-module location 0/2 mxponder trunk-rate 500G
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the card is configured in the muxponder mode with a 550G trunk payload.

```
RP/0/RP0/CPU0:ios#config
Tue Oct 15 01:24:56.355 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder client-rate 100GE
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder trunk-rate 550G
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the card is configured in the muxponder mode with OTU4 client payload and 500G trunk payload.

```
RP/0/RP0/CPU0:ios#configure
Sun Feb 24 14:09:33.989 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/2 mxponder client-rate OTU4
RP/0/RP0/CPU0:ios(config)#hw-module location 0/2 mxponder trunk-rate 500G
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the card is configured in the muxponder slice 0 mode with a 300G trunk payload.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0 client-rate 100GE
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0 trunk-rate 300G
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the card is configured in the muxponder slice 1 mode with a 400G trunk payload.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 1 client-rate 100GE
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 1 trunk-rate 400G
RP/0/RP0/CPU0:ios(config)#commit
```

The following example shows how to configure LLDP drop on a muxponder slice.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0 drop-lldp
```

The following is a sample in which all the client ports are configured with AINS with soak time as 15 minutes.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#hw-module location 0/3 mxponder client-rate 100GE trunk-rate 500G
RP/0/RP0/CPU0:ios(config)#hw-module location 0/3 mxponder client-port-ains-soak hours 0
minutes 15
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample to configure the card in Regen mode.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#hw-module location 0/0
RP/0/RP0/CPU0:ios(config-hwmod)#regen
RP/0/RP0/CPU0:ios(config-regen)#trunk-rate 400
RP/0/RP0/CPU0:ios(config-regen)#commit
RP/0/RP0/CPU0:ios(config-regen)#exit
```

The following is a sample in which the card is configured with mixed client rates in the muxponder slice mode.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 23 06:10:22.227 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0 client-rate OTU4 trunk-rate
500G
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 1 client-rate 100GE trunk-rate
500G
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample to configure MAC address or ARP snoop on client ports for Mxponder mode configuration.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 16 19:08:17.154 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder arp-snoop
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample to configure MAC address snoop on client ports for slice mode configuration.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 16 19:30:33.933 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/3 mxponder-slice 0
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-rate 100GE
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#trunk-rate 600G
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#arp-snoop
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#commit
Mon Mar 16 19:30:52.636 UTC
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#end
```

The following example shows how to configure trunk rate to 50G:

```
RP/0/RP0/CPU0:(config)#hw-module location 0/0 mxponder
RP/0/RP0/CPU0:(config-hwmod-mxp)#trunk-rate 50G
RP/0/RP0/CPU0:(config-hwmod-mxp)#commit
```

hw-module (OTN-XP Card)

To configure the OTN-XP card in the muxponder mode, use the **hw-module** command in IOS XR configuration mode.

hw-module location *location* **mxponder-slice** *mxponder-slice-number* **trunk-rate** [100G | 200G | 300G] **client-port-rate** *client-port-number* **lane** *lane number* **client-type** [10GE | OTU2 | OTU2e | 400GE]

Syntax Description		
location <i>location</i>		Specifies the location of the optics controller.
mxponder-slice <i>mxponder-slice-number</i>		Configures the card in muxponder mode. The muxponder configuration supports two slices, 0 and 1.
trunk-rate		Specifies the traffic rate on the trunk ports. The supported trunk rates is 100G, 200G, and 300G.
client-port-rate <i>client-port-number</i>		Specifies client port number. - Mxponder-slice 0—Client ports 4, 5, and 2 are mapped to the trunk port 0. - Mxponder-slice 1—Client ports 7, 6, and 11 are mapped to the trunk port 1.
lane <i>lane-number</i>		Specifies client port lane number.

client-type [10GE | OTU2 | OTU2e | 400GE]

Specifies the traffic type on the client ports. The supported client types are 10GE, OTU2, OTU2e, and 400GE.

Command Default

None

Command Modes

Cisco IOS XR Configuration

Command History

Release	Modification
Release 7.2.1	This command was introduced.
Release 7.3.2	The trunk rates 200G, and 300G were introduced.
Release 7.3.2	The client rate 400GE was introduced.

Example

The following is a sample in which the OTN-XP card is configured with mixed client rates in the mxponder-slice 0 mode.

```
RP/0/RP0/CPU0:ios#config
Tue Apr 21 09:21:44.460 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#trunk-rate 100G
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-port-rate 2 lane 3 client-type OTU2
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-port-rate 2 lane 4 client-type OTU2
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-port-rate 4 lane 1 client-type 10GE
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#commit
```

The following sample configures inverse muxponder for 400GE over 2x200G CFP2 trunk ports.

```
RP/0/RP0/CPU0:ios(config)#hw-module location 0/0 mxponder
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#trunk-rate 200G
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-port-rate 10 client-type 400GE
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#commit
```

The following sample configures 300G trunk rate on the OTN-XP card:

```
RP/0/RP0/CPU0:ios#config
Wed Jun 2 17:17:59.409 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#trunk-rate 300G
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#commit
```

ikev2 policy

To specify an IKEv2 policy name, use the **ikev2 policy** command in configuration mode.

ikev2 policy *policy-name*

Syntax Description	<i>policy-name</i> IKEv2 policy name upto 32 characters.				
Command Default	None				
Command Modes	Configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:26:45.752 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 policy mypolicy
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#match address local 10.0.0.1
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#commit
Thu Mar  7 19:29:25.043 UTC
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 policy mypolicy
Thu Mar  7 19:30:30.343 UTC
```

```
Policy Name : mypolicy
=====
Total number of match local addr : 1
  Match address local : 10.0.0.1
-----
Total number of proposal attached : 1
  Proposal Name : proposal1
```

ikev2 profile

To configure an IKEv2 profile, use the **ikev2 profile** command in configuration mode.

ikev2 profile *profile-name*

Syntax Description	<i>profile-name</i> Name of the IKEv2 profile.
Command Default	None
Command Modes	Configuration

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which an IKEv2 profile is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar 7 20:00:36.490 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 profile profile1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#match identity remote address 10.0.0.1
255.255.255.0
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#keyring kyr1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#lifetime 120
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#commit
Thu Mar 7 20:15:03.401 UTC
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 profile profile1
Thu Mar 7 20:15:25.776 UTC
```

```
Profile Name : profile1
=====
Keyring : kyr1
Lifetime (Sec) : 120
DPD Interval (Sec) : 10
DPD Retry Interval (Sec) : 2
Match ANY : NO
Total Match remote peers : 1
Addr/Prefix : 10.0.0.1/255.255.255.0
```

ikev2 proposal

To specify an IKEv2 proposal name, use the **ikev2 proposal** command in the configuration mode .

ikev2 proposal *proposal-name*

Syntax Description	<i>proposal-name</i> Name of IKEv2 proposal upto 32 characters.	
Command Default	None	
Command Modes	Configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which an IKEv2 proposal is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:19:30.259 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#encryption aes-cbc-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#integrity sha-1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#prf sha-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#dh 20
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#commit
Thu Mar  7 19:20:30.916 UTC
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 proposal proposal1
Thu Mar  7 19:20:48.929 UTC
```

```
Proposal Name           : proposal1
=====
Status                  : Complete
-----
Total Number of Enc. Alg. : 1
    Encr. Alg.           : CBC-AES-256
-----
Total Number of Hash. Alg. : 1
    Hash. Alg.           : SHA 1
-----
Total Number of PRF. Alg. : 1
    PRF. Alg.            : SHA 256
-----
Total Number of DH Group : 1
    DH Group             : Group 20
```

integrity

To specify one or more transforms of the integrity algorithm type, use the **integrity** command in IKEv2 proposal configuration mode.

integrity *algorithm-type*

Syntax Description	<i>algorithm-type</i> Integrity algorithm type. The possible values are: sha-1, sha-256, sha-384, and sha-512.				
Command Default	None				
Command Modes	IKEv2 proposal configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 proposal is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:19:30.259 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#encryption aes-cbc-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#integrity sha-1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#prf sha-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#dh 20
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#commit
Thu Mar  7 19:20:30.916 UTC
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 proposal proposal1
Thu Mar  7 19:20:48.929 UTC
```

```
Proposal Name           : proposal1
```

```
=====
Status                  : Complete
-----
```

```
Total Number of Enc. Alg. : 1
  Encr. Alg.                : CBC-AES-256
-----
```

```
Total Number of Hash. Alg. : 1
  Hash. Alg.                : SHA 1
```

```
-----
Total Number of PRF. Alg. : 1
  PRF. Alg.                : SHA 256
-----
```

```
Total Number of DH Group : 1
  DH Group                : Group 20
```

interface gcc0

To configure the GCC0 interface, use the **interface gcc0** command in configuration mode.

interface gcc0 *R/S/I/P*

Syntax Description	<i>R/S/I/P</i> Rack/Slot/Instance/Port of the GCC0 interface.	
Command Default	None	
Command Modes	Configuration	
Command History	Release	Modification
	Release 7.1.1	This command is introduced.

Example

The following is a sample to configure the GCC0 interface using the static IP address.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#interface gcc0 0/1/0/0
P/0/RP0/CPU0:ios(config-if)#ipv4 address 10.1.1.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-if)#commit
RP/0/RP0/CPU0:ios(config-if)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show run interface gcc0 0/1/0/0
interface GCC00/1/0/0
ipv4 address 10.1.1.1 255.255.255.0
!
```

The following is a sample to configure the GCC0 interface using the loopback IP address.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:R2(config)#interface gcc0 0/1/0/0
RP/0/RP0/CPU0:R2(config-if)#ipv4 unnumbered loopback 0
RP/0/RP0/CPU0:ios(config-if)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

interface gcc2

To configure the GCC2 interface, use the **interface gcc2** command in configuration mode.

interface gcc2 *R/S/I/P/L*

Syntax Description	<i>R/S/I/P/L</i> Rack/Slot/Instance/Port/Lane of the GCC2 interface.	
Command Default	None	
Command Modes	Configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample to configure the GCC2 interface using the static IP address.

```
RP/0/RP0/CPU0:ios#config
Tue Mar 12 11:16:04.749 UTC
RP/0/RP0/CPU0:ios(config)#interface gcc2 0/1/0/0/1
P/0/RP0/CPU0:ios(config-if)#ipv4 address 10.0.0.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-if)#commit
Tue Mar 12 11:18:32.867 UTC
RP/0/RP0/CPU0:ios(config-if)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

```
RP/0/RP0/CPU0:ios#show run interface gcc2 0/1/0/0/1
Tue Mar 12 11:19:00.475 UTC
interface gcc2 0/1/0/0/1
  ipv4 address 10.0.0.1 255.255.255.0
!
```

The following is a sample to configure the GCC2 interface using the loopback IP address.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:R2(config)#interface gcc2 0/1/0/0/1
RP/0/RP0/CPU0:R2(config-if)#ipv4 unnumbered loopback 0
RP/0/RP0/CPU0:ios(config-if)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

ipcc routed

To specify the LMP neighbor IPCC configuration for GMPLS UNI, use the **ipcc routed** command in the neighbor sub-mode for LMP GMPLS-UNI controller configuration mode.

ipcc routed

Syntax Description	This command has no keywords or arguments.	
Command Default	None	
Command Modes	LMP GMPLS-UNI controller neighbor configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.
Usage Guidelines	The LMP submode enables GMPLS-UNI LMP functionality and acts as a container for other GMPLS-UNI LMP configuration commands.	

Example

The following example shows how to specify the IPCC configuration for the GMPLS UNI controller 0/0/0/0, neighbor UN02.

```
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#neighbor UN02
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-nbr-UN02)#ipcc routed
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-nbr-UN02)#
```

ipv4 access-group

To configure the Access List (ACL), use the **ipv4 access-group** command at the IPv4 interface in the interface configuration mode.

ipv4 access-group *access-list-name* { **ingress** | **egress** }

Syntax Description

<i>access-list-name</i>	Access list name. Names cannot contain a space or quotation marks.
ingress	Specifies an inbound interface.
egress	Specifies an outbound interface.

Command Default

No IPv4 access list is defined.

Command Modes

Interface configuration

Command History

Release	Modification
Release 7.0.1	This command is introduced.

Usage Guidelines

Use the **ipv4 access-list** command to configure an IPv4 access list. This command places the system in access list configuration mode, in which the denied or permitted access conditions must be defined with the **deny** or **permit** command.

Example

The following examples shows how to configure the Access List at the IPv4 interface in the configuration mode:

```
interface MgmtEth0/RP0/CPU0/0
ipv4 address 10.1.1.1 255.255.255.0
ipv4 access-group IPV4_ICMP_DENY ingress
ipv4 access-group IPV4_ROUTER_FWD_TELNET_TRAFFIC_DENY egress
```

Sample Configuration for IPv4 Access Lists

```
ipv4 access-list IPV4_ICMP_DENY
10 deny icmp any any
20 permit ipv4 any any
!
ipv4 access-list IPV4_ROUTER_FWD_TELNET_TRAFFIC_DENY
10 deny tcp any any eq telnet
20 permit ipv4 any any
!
```

ipv6 access-group

To configure the Access List (ACL), use the **ipv6 access-group** command at the IPv6 interface in the interface configuration mode.

```
ipv6 access-group access-list-name { ingress | egress }
```

Syntax Description

<i>access-list-name</i>	Access list name. Names cannot contain a space or quotation marks.
ingress	Specifies an inbound interface.
egress	Specifies an outbound interface.

Command Default

No IPv6 access list is defined.

Command Modes

Interface configuration

Command History

Release	Modification
Release 7.0.1	This command is introduced.

Usage Guidelines

Use the **ipv6 access-list** command to configure an IPv6 access list. This command places the system in access list configuration mode, in which the denied or permitted access conditions must be defined with the **deny** or **permit** command.

Example

The following examples shows how to configure the Access List at the IPv6 interface in the configuration mode

```
interface MgmtEth0/RP0/CPU0/0
ipv6 address 1000::1/64
ipv6 access-group IPV6_SSH_DENY ingress
ipv6 access-group IPV6_ROUTER_FWD_TELNET_TRAFFIC_DENY egress
```

Sample Configuration for IPv6 Access Lists

```
ipv6 access-list IPV6_SSH_DENY
10 deny tcp any any eq ssh
20 permit ipv6 any any
!
ipv6 access-list IPV6_ROUTER_FWD_TELNET_TRAFFIC_DENY
10 deny tcp any any eq telnet
20 permit ipv6 any any
!
```

keyring

To specify the keyring name, use the **keyring** command in the configuration mode.

keyring *keyring-name*

Syntax Description	<i>keyring-name</i> Name of the keyring upto 32 characters.
---------------------------	---

Command Default	None
------------------------	------

Command Modes	Configuration
----------------------	---------------

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which a keyring is configured.

```
RP/0/RP0/CPU0:ios#conf
Thu Mar  7 19:33:14.594 UTC
RP/0/RP0/CPU0:ios(config)#keyring kyr1
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#peer peer1
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#address 10.0.0.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#pre-shared-key password 14341B180F547B7977
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#commit
Thu Mar  7 19:54:33.314 UTC
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#exit
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show keyring kyr1
Thu Mar  7 19:58:07.135 UTC
```

```
Keyring Name                : kyr1
=====
Total Peers                  : 1
-----
Peer Name                    : peer1
IP Address                   : 10.0.0.1
Subnet Mask                   : 255.255.255.0
Local PSK                    : Configured
Remote PSK                   : Configured
```

lc-module (OTN-XP Card)

To configure the LC mode on the OTN-XP card, use the **lc-module** command in IOS XR configuration mode.

lc-module location *location* **lcmode** *mode*

Syntax Description	location <i>location</i>	Specifies the location of the optics controller.
---------------------------	---------------------------------	--

lcmode mode

Configures the line card mode.

The LC modes supported on the OTN-XP card are:

- 100G-TXP
- 10G-GREY-MXP
- 4x100G-MXP-400G-TXP

Note Only 10G-GREY-MXP is supported in Release 7.2.1 even though all the above modes are software configurable.

Command Default

None

Command Modes

Cisco IOS XR Configuration

Command History

Release	Modification
Release 7.2.1	This command was introduced.

Example

The following is a sample in which the OTN-XP card is configured in the 10G-GREY-MXP mode.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar 26 21:40:51.495 UTC
RP/0/RP0/CPU0:ios(config)#lc-module location 0/1 lcmode 10G-GREY-MXP
RP/0/RP0/CPU0:ios(config)#commit
```

license smart register

To register the device instance with Cisco licensing cloud, use the **license smart register idtoken token-id force** command.

license smart register idtoken token-id force

Syntax Description

token_id	Specifies the token generated in smart manager.
force	If the registration fails due to communication failure between the device and the portal or satellite, the system waits for 24 hours before attempting to register the device again. Use this option to force the registration.

Command Default

None

Command Modes None

Command History	Release	Modification
	Release 7.0.1	This command was introduced.

Usage Guidelines Use this command to register the device instance with Cisco licensing cloud.

The following example registers and sets the token ID required for registration of NCS 1004.

```
RP/0/RP0/CPU0:ios#license smart register token-id
```

license smart renew

To manually renew the ID certification or authorization, use the **license smart renew** command.

license smart renew id { ID|auth }

Syntax Description	ID
	ID certificates are renewed automatically after six months. In case, the renewal fails, the product instance goes into unidentified state. You can manually renew the ID certificate using this option.
	auth Authorization periods are renewed by the Smart Licensing system every 30 days. As long as the license is in an 'Authorized' or 'Out-of-compliance' (OOC), the authorization period is renewed. Use this command to make an on-demand manual update of your registration. Thus, instead of waiting 30 days for the next registration renewal cycle, you can use this option to instantly find out the status of your license.
	After 90 days, the authorization period expires and the status of the associated licenses display "AUTH EXPIRED". Use this option to retry the authorization period renewal. If the retry is successful, a new authorization period begins.

Command Default None

Command Modes None

Command History	Release	Modification
	R7.0.1	This command was introduced.

Usage Guidelines None

The following example manually renews the ID certificate for NCS 1004.

```
RP/0/RP0/CPU0:ios#license smart renew id
```

The following example manually renews the authorization for NCS 1004.

```
RP/0/RP0/CPU0:ios#license smart renew auth
```

license smart deregister

To cancel the registration of your device, use the **license smart deregister** command.

license smart deregister

Command Default	None
-----------------	------

Command Modes	None
---------------	------

Command History	Release	Modification
	R7.0.1	This command was introduced.

Usage Guidelines	When your device is taken off the inventory, shipped elsewhere for redeployment or returned to Cisco for replacement using the return merchandise authorization (RMA) process, you can use this command to cancel the registration on your device. All smart licensing entitlements and certificates on the platform are removed.
------------------	---

The following example deregisters NCS 1004.

```
RP/0/RP0/CPU0:ios#license smart deregister
```

lifetime

To configure the lifetime of IKEv2 security association (SA), use the **lifetime** command in IKEv2 profile configuration mode.

lifetime *seconds*

Syntax Description	<i>seconds</i> Specifies the lifetime in seconds. The range is from 120 to 86400 seconds.
--------------------	---

Command Default	None
-----------------	------

Command Modes	IKEv2 profile configuration
---------------	-----------------------------

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which an IKEv2 profile is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 20:00:36.490 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 profile profile1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#match identity remote address 10.0.0.1
```

```

255.255.255.0
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#keyring kyr1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#lifetime 120
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#commit
Thu Mar  7 20:15:03.401 UTC
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 profile profile1
Thu Mar  7 20:15:25.776 UTC

```

```

Profile Name                               : profile1
=====
Keyring                                   : kyr1
Lifetime (Sec)                           : 120
DPD Interval (Sec)                       : 10
DPD Retry Interval (Sec)                 : 2
Match ANY                                : NO
Total Match remote peers                  : 1
Addr/Prefix                              : 10.0.0.1/255.255.255.0

```

link-id ipv4 unicast

To specify the local optical interface address for an LMP link for a GMPLS UNI controller, use the **link-id ipv4 unicast** command in GMPLS-UNI controller configuration mode.

link-id ipv4 unicast *address*

Syntax Description	<i>address</i> Specifies the optical unicast IPv4 address.
---------------------------	--

Command Default	None
------------------------	------

Command Modes	LMP GMPLS-UNI controller configuration
----------------------	--

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following example shows how to specify the local optical interface address for an LMP link.

```

RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#link-id ipv4 unicast 11.1.1.1
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#

```

Imp

To enable functionality for GMPLS UNI LMP and enter LMP configuration commands, use the **Imp** command in global configuration mode.

Imp

Syntax Description	This command has no keywords or arguments.				
Command Default	None				
Command Modes	Global configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following example shows how to enable LMP functionality and enter the sub-mode for LMP configuration commands.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#
```

match address local

To specify the IP address of the local node, use the **match address local** command in the IKEv2 policy configuration mode.

match address local *ipv4-address*

Syntax Description	<i>ipv4-address</i> IP address of the local node.				
Command Default	None				
Command Modes	IKEv2 policy configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:26:45.752 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 policy mypolicy
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#match address local 10.0.0.1
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#commit
Thu Mar  7 19:29:25.043 UTC
RP/0/RP0/CPU0:ios(config-ikev2-policy-mypolicy)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 policy mypolicy
Thu Mar  7 19:30:30.343 UTC
```

```
Policy Name                               : mypolicy
=====
```

```
Total number of match local addr         : 1
Match address local                       : 10.0.0.1
-----
```

```
Total number of proposal attached        : 1
Proposal Name                             : proposal1
```

match identity remote address

To specify the IP address of the remote node, use the **match identity remote address** command in IKEv2 profile configuration mode.

match identity remote address { *ipv4-address* [*subnet-mask*] }

Syntax Description	<i>ipv4-address</i>	IP address of the remote node.
---------------------------	---------------------	--------------------------------

<i>subnet-mask</i>	Subnet mask address.
--------------------	----------------------

Command Default	None
------------------------	------

Command Modes	IKEv2 profile configuration
----------------------	-----------------------------

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which an IKEv2 profile is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 20:00:36.490 UTC
```

```
RP/0/RP0/CPU0:ios(config)#ikev2 profile profile1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#match identity remote address 10.0.0.1
255.255.255.0
```

```
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#keyring kyr1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#lifetime 120
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#commit
Thu Mar  7 20:15:03.401 UTC
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 profile profile1
Thu Mar  7 20:15:25.776 UTC
```

```
Profile Name                               : profile1
=====
Keyring                                   : kyr1
Lifetime (Sec)                           : 120
DPD Interval (Sec)                       : 10
DPD Retry Interval (Sec)                 : 2
Match ANY                                : NO
Total Match remote peers                  : 1
Addr/Prefix                              : 10.0.0.1/255.255.255.0
```

neighbor interface-id unnumbered

To specify the neighbor's optical interface ID of an LMP link for a GMPLS UNI controller, use the **neighbor interface-id unnumbered** command in GMPLS-UNI controller configuration mode.

neighbor interface-id unnumbered *interface-id*

Syntax Description	<i>interface-id</i> Specifies the optical interface ID of the neighbor.				
Command Default	None				
Command Modes	LMP GMPLS-UNI controller configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following example shows how to specify the optical interface ID of an LMP neighbor.

```
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#neighbor interface-id unnumbered 2130706976
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#
```

neighbor link-id ipv4 unicast

To specify the neighbor's optical address of an LMP link for a GMPLS UNI controller, use the **neighbor link-id ipv4 unicast** command in GMPLS-UNI controller configuration mode.

neighbor link-id ipv4 unicast *address*

Syntax Description	<i>address</i> Specifies the IPv4 address of the neighbor.				
Command Default	None				
Command Modes	LMP GMPLS-UNI controller configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following example shows how to specify the optical IPv4 address (10.1.1.1) of an LMP neighbor for controller 0/0/0/0:

```
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#neighbor link-id ipv4 unicast 10.1.1.1
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#
```

neighbor

To specify an LMP neighbor for GMPLS and enter commands to configure the neighbor, use the **neighbor** command in the LMP GMPLS-UNI configuration mode.

neighbor *name*

Syntax Description	<i>name</i> Specifies the name of the LMP neighbor.				
Command Default	None				
Command Modes	LMP GMPLS-UNI configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Usage Guidelines

Under the LMP GMPLS UNI submode, this command creates a submode in which other properties of the neighbor can be specified.

Example

The following example shows how to specify the neighbor UN01 for the GMPLS-UNI controller 0/0/0/0.

```
RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#neighbor UN01
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-nbr-UN01)#exit
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#neighbor UN01
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-ctrl)#
```

otnsec policy

To configure an OTNSec policy, use the **otnsec policy** command in the configuration mode.

otnsec policy *policy-name*

Syntax Description

<i>policy-name</i>	Policy name
--------------------	-------------

Command Default

None

Command Modes

Configuration

Command History

Release	Modification
Release 7.0.1	This command is introduced.

Example

The following is a sample in which an OTNSec policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 11 15:16:58.417 UTC
RP/0/RP0/CPU0:ios(config)#otnsec policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec-policy)#cipher-suite AES-GCM-256
RP/0/RP0/CPU0:ios(config-otnsec-policy)#security-policy must-secure
RP/0/RP0/CPU0:ios(config-otnsec-policy)#sak-rekey-interval 120
RP/0/RP0/CPU0:ios(config-otnsec-policy)#commit
```

The following is a sample of an OTNSec policy.

```
RP/0/RP0/CPU0:ios#show run otnsec policy otnsec-policy1
Tue Mar 12 11:14:03.591 UTC
otnsec policy otnsec-policy1
  cipher-suite AES-GCM-256
```

```
security-policy must-secure
sak-rekey-interval 120
!
```

path-option

To specify a path option for a GMPLS UNI tunnel, use the **path-option** command in GMPLS UNI controller tunnel-properties configuration sub-mode.

path-option 10 { no-ero | explicit { name *path-name* | index *index* } } [xro-attribute-set *name*] [lockdown] [verbatim]

Syntax Description	10	Specifies the path option index. 10 is the only supported index
	explicit	Specifies that LSP paths are IP explicit paths.
	name <i>path-name</i>	Specifies the path name of the IP explicit path.
	no-ero	Specifies that no ERO object is included in signalling.
	xro-attribute-set	(Optional) Specifies the xro attribute set for the path option.
	<i>name</i>	Specifies the name of the xro-attribute-set.
	lockdown	(Optional) Indicates that the tunnel does not reoptimize without user intervention.
	verbatim	(Optional) Bypasses the topology check for explicit paths.
Command Default	None	
Command Modes	GMPLS UNI controller tunnel-properties configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following example shows how to specify the tunnel path option for controller 0/0/0/0, attribute set A01..

```
RP/0/RP0/CPU0:ios(config)#mpls traffic-eng
RP/0/RP0/CPU0:ios(config-mpls-te)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-te-gmpls)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-te-gmpls-cntl)#tunnel-properties
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#path-option 10 no-ero xro-attribute-set A01 lockdown
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#
```

peer

To specify the peer node during keyring configuration, use the **peer** command in keyring configuration mode.

peer *peer-name*

Syntax Description	<i>peer-name</i> Peer node name.				
Command Default	None				
Command Modes	Keyring configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which a keyring is configured.

```
RP/0/RP0/CPU0:ios#conf
Thu Mar  7 19:33:14.594 UTC
RP/0/RP0/CPU0:ios(config)#keyring kyr1
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#peer peer1
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#address 10.0.0.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#pre-shared-key kyr1|clear
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#commit
Thu Mar  7 19:54:33.314 UTC
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#exit
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show keyring kyr1
Thu Mar  7 19:58:07.135 UTC
```

```
Keyring Name                               : kyr1
=====
Total Peers                               : 1
-----
```

```
Peer Name                                  : peer1

IP Address                                : 10.0.0.1
Subnet Mask                              : 255.255.255.0
Local PSK                                : Configured
Remote PSK                               : Configured
```

pki trustpoint

To specify the trustpoints for use with the RSA signature authentication method, use the **pki trustpoint** command in IKEv2 profile configuration mode

pki trustpoint *trustpoint-label*

Syntax Description	<i>trustpoint-label</i> Specifies the name of the trustpoint.				
Command Default	None				
Command Modes	IKEv2 profile configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>R7.2.1</td><td>This command was introduced.</td></tr> </table>	Release	Modification	R7.2.1	This command was introduced.
Release	Modification				
R7.2.1	This command was introduced.				

Example

The following example shows how to specify the authentication mode in the IKEv2 profile.

```
RP/0/RP0/CPU0:ios#configure
Thu May 7 16:22:33.804 IST
RP/0/RP0/CPU0:ios(config)#ikev2 profile IP1
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#match identity remote address 1.1.1.2
255.255.255.255
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#pki trustpoint myca
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#lifetime 120
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#authentication local rsa-signature
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#authentication remote rsa-signature
RP/0/RP0/CPU0:ios(config-ikev2-profile-IP1)#commit
```

pm

To configure the performance monitoring parameters of the optics, Ethernet, and coherent DSP controllers, use the **pm** command in the controller configuration mode.

pm [**15-min** | **30-sec** | **24-hour**] [**optics** | **ether** | **pcs** | **fec** | **otn**] [**report** | **threshold**] *value*

Syntax Description	<table> <tr> <td>15-min 30-sec 24-hour</td><td>Configures performance monitoring parameters for 15 minute or 30 second or 24 hour intervals.</td></tr> <tr> <td>optics ether pcs fec otn</td><td>Specifies whether to configure performance monitoring parameters for the optics, Ethernet, or coherent DSP controllers.</td></tr> <tr> <td>report</td><td>Configures optics TCA reporting status.</td></tr> <tr> <td>threshold</td><td>Configures threshold on optics parameters.</td></tr> <tr> <td><i>value</i></td><td>Value of the reporting or threshold parameters.</td></tr> </table>	15-min 30-sec 24-hour	Configures performance monitoring parameters for 15 minute or 30 second or 24 hour intervals.	optics ether pcs fec otn	Specifies whether to configure performance monitoring parameters for the optics, Ethernet, or coherent DSP controllers.	report	Configures optics TCA reporting status.	threshold	Configures threshold on optics parameters.	<i>value</i>	Value of the reporting or threshold parameters.
15-min 30-sec 24-hour	Configures performance monitoring parameters for 15 minute or 30 second or 24 hour intervals.										
optics ether pcs fec otn	Specifies whether to configure performance monitoring parameters for the optics, Ethernet, or coherent DSP controllers.										
report	Configures optics TCA reporting status.										
threshold	Configures threshold on optics parameters.										
<i>value</i>	Value of the reporting or threshold parameters.										
Command Default	None										
Command Modes	Controller configuration										

Command History

Release	Modification
Release 7.0.1	This command was introduced.

Usage Guidelines

The following table describes the optics PM parameters.

Parameter	Description
cd	Chromatic dispersion TCA reporting status or threshold
dgd	Differential group delay TCA reporting status or threshold
lbc	lbc TCA reporting status or threshold
lbc-pc	lbc percentage TCA reporting status or threshold
low-freq-off	low signal frequency offset TCA reporting status or threshold
opr	opr/opr-dbm TCA reporting status or threshold
opt	opt/opt-dbm TCA reporting status or threshold
osnr	Optical Signal to Noise Ratio TCA reporting status or threshold
pcr	Polarization Change Rate TCA reporting status or threshold
pdl	Polarization Dependent Loss TCA reporting status or threshold
pn	Phase Noise TCA reporting status or threshold
rx-sig-pow	rx signal power TCA reporting status or threshold
sopmd	Second Order Polarization Mode Dispersion TCA reporting status or threshold

The following table describes the OTN PM parameters.

Parameter	Description
ES-NE	Error seconds in the near end
ESR-NE	Error seconds ratio in the near end
SES-NE	Severely error seconds in the near end
SESR-NE	Severely error seconds ratio in the near end
UAS-NE	Unavailable seconds in the near end
BBE-NE	Background block errors in the near end
BBER-NE	Background block errors ratio in the near end
FC-NE	Failure counts in the near end
ES-FE	Error seconds in the far end

Parameter	Description
ESR-FE	Error seconds ratio in the far end
SES-FE	Severely error seconds in the far end
SESR-FE	Severely error seconds ratio in the far end
UAS-FE	Unavailable seconds in the far end
BBE-FE	Background block errors in the far end
BBER-FE	Background block errors ratio in the far end
FC-FE	Failure counts in the far end

The following table describes the Ethernet PM parameters.

Parameter	Description
rx-util	Bandwidth utilization of port at the ingress side in percentage.
tx-util	Bandwidth utilization of port at egress side in percentage.
rx-pkt	Number of received packets
stat-pkt	Status of received packets
octet-stat	Total number of octets of data received in the network
oversize-pkt	Total number of packets received that were longer than 1518 octets and were otherwise well formed
jabber-stats	Total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error)
in-64-octets	Total number of packets received that were 64 octets in length
in-65-127-octets	Total number of packets received that were between 65 and 127 octets in length
in-128-255-octets	Total number of packets received that were between 128 and 255 octets in length
in-256-511-octets	Total number of packets received that were between 256 and 511 octets in length
in-512-1023-octets	Total number of packets received that were between 512 and 1023 octets in length
in-1024-1518-octets	Total number of packets received that were between 1024 and 1518 octets in length
in-mcast	Total number of multicast frames received error-free

Parameter	Description
in-bcast	Total number of broadcast frames received error-free
out-bcast	Total number of broadcast frames transmitted error-free
out-mcast	Total number of multicast frames transmitted error-free
tx-pkt	Number of transmitted packets
out-octets	Total number of octets transmitted out of the interface, including framing characters
ether-stat-multicast-pkt	Status of multicast packets
ether-stat-broadcast-pkt	Status of broadcast packets
ether-stat-undersized-pkt	Number of good packets received that are shorter than 64 bytes.
tx-undersized-pkt	Total number of packets transmitted that are shorter than 64 bytes.
tx-oversized-pkt	Total number of oversized packets transmitted.
tx-fragments	Total number of fragmented packets transmitted.
tx-jabber	Total number of Jabber packets transmitted.
tx-bad-fcs	Total number of bad FCS packets transmitted.
fcs-err	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
ifIn-Octets	Total number of octets received on the interface, including framing characters.
ifIn-errors	Number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol.
in-good-bytes	Total number of good bytes or octets received.
in-good-pkts	Total number of good packets received.
long-frame	A count of frames received on a particular interface that exceed the maximum permitted frame size.
out-good-bytes	Total number of good bytes or octets transmitted
out-good-pkts	Total number of good packets transmitted.
1024-1518-octets	Total number of packets (including error packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
128-255-octets	Total number of packets (including error packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Parameter	Description
256-511-octets	Total number of packets (including error packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
512-1023-octets	Total number of packets (including error packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
64-octets	Total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
65-127-octets	Total number of packets (including error packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

The following table describes the FEC PM parameters.

Parameter	Description
ec-words	Number of bit errors that are corrected by the system
uc-words	Number of words that are not corrected by the system

The following table describes the PCS PM parameters.

Parameter	Description
PCS-ES	Error seconds
PCS-SES	Severely error seconds
PCS-UAS	Unavailable seconds
PCS-ES-FE	Error seconds in far end
PCS-SES-FE	Severely error seconds in far end
PCS-UAS-FE	Unavailable seconds in far end

Example

The following is a sample in which the performance monitoring parameters of optics controller is configured in 24 hour intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller optics 0/0/1/1 pm 24-hour optics threshold osnr max
345
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the performance monitoring parameters of the ethernet controller is configured in 15 minute intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigEctrlr 0/3/0/2 pm 15-min pcs report bip
enable
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which performance monitoring parameters of Coherent DSP controller is configured in 30 second intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/1/1 pm 30-sec fec threshold post-fec-ber
max OE-15
RP/0/RP0/CPU0:ios(config)#commit
```

pre-shared-key

To configure the pre-shared keys for authentication, use the **pre-shared-key** command in keyring configuration mode.

pre-shared-key{*key*} { **clear** *cleartext-key* } { **local** *local-key* } { **password** *encrypted-key* }

Syntax Description	<i>key</i>	Pre-shared key in clear text for the peer node.
	clear <i>cleartext-key</i>	Stores the key in clear text.
	password <i>encrypted-key</i>	Stores the key as a type-7 encrypted password.
	local <i>local-key</i>	Specifies the pre-shared key for the local node.

Command Default None

Command Modes Keyring configuration

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following is a sample in which a keyring is configured.

```
RP/0/RP0/CPU0:ios#conf
Thu Mar  7 19:33:14.594 UTC
RP/0/RP0/CPU0:ios(config)#keyring kyr1
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#peer peer1
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#address 10.0.0.1 255.255.255.0
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#pre-shared-key password 14341B180F547B7977
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#commit
Thu Mar  7 19:54:33.314 UTC
RP/0/RP0/CPU0:ios(config-keyring-kyr1-peer-peer1)#exit
RP/0/RP0/CPU0:ios(config-keyring-kyr1)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

```
RP/0/RP0/CPU0:ios#show keyring kyr1
Thu Mar  7 19:58:07.135 UTC
```

```
Keyring Name           : kyr1
=====
Total Peers            : 1
-----
Peer Name              : peer1
IP Address             : 10.0.0.1
Subnet Mask            : 255.255.255.0
Local PSK              : Configured
Remote PSK             : Configured
```

prf

To specify the Pseudo-Random Function (PRF) algorithm type, use the **prf** command in IKEv2 proposal configuration mode.

prf *prf-algorithm*

Syntax Description	<i>prf-algorithm</i> PRF algorithm type. The possible values are sha-1, sha-256, sha-384, and sha-512.				
Command Default	None				
Command Modes	IKEv2 proposal configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an IKEv2 proposal is configured.

```
RP/0/RP0/CPU0:ios#configure
Thu Mar  7 19:19:30.259 UTC
RP/0/RP0/CPU0:ios(config)#ikev2 proposal proposal1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#encryption aes-cbc-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#integrity sha-1
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#prf sha-256
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#dh 20
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#commit
Thu Mar  7 19:20:30.916 UTC
RP/0/RP0/CPU0:ios(config-ikev2-proposal-proposal1)#exit
RP/0/RP0/CPU0:ios(config)#exit
RP/0/RP0/CPU0:ios#show ikev2 proposal proposal1
Thu Mar  7 19:20:48.929 UTC
```

```
Proposal Name          : proposal1
=====
Status                 : Complete
-----
Total Number of Enc. Alg. : 1
Encr. Alg.             : CBC-AES-256
```

```

-----
Total Number of Hash. Alg. : 1
    Hash. Alg.              : SHA 1
-----

Total Number of PRF. Alg.  : 1
    PRF. Alg.               : SHA 256
-----

Total Number of DH Group   : 1
    DH Group                : Group 20
-----

```

router-id ipv4 unicast

To configure the LMP unicast or neighbor router ID for GMPLS, use the **router-id** command in the LMP GMPLS UNI configuration or LMP GMPLS UNI neighbor configuration mode.

router-id ipv4 unicast *address*

Syntax Description	<i>address</i> Specifies the GMPLS UNI optical router-id (IPv4 address).				
Command Default	None				
Command Modes	LMP GMPLS UNI configuration LMP GMPLS UNI neighbor configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following example shows how to specify a router ID (address 10.10.4.4) for GMPLS UNI.

```

RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#router-id ipv4 unicast 10.10.4.4
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)

```

The following example shows how to specify the neighbor router ID 10.10.5.5 for GMPLS UNI.

```

RP/0/RP0/CPU0:ios(config)#lmp
RP/0/RP0/CPU0:ios(config-lmp)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni)#neighbor UN01
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-nbr-UN01)#router-id ipv4 unicast 10.10.5.5
RP/0/RP0/CPU0:ios(config-lmp-gmpls-uni-nbr-UN01)#

```

sak-rekey-interval

To configure the key lifetime for the child security associations (SA), use the **sak-rekey-interval** command in OTNSec policy configuration mode.

sak-rekey-interval *seconds*

Syntax Description	<i>seconds</i> SAK rekey timer in seconds. The range is from 30 to 1209600 seconds.				
Command Default	None				
Command Modes	OTNSec policy configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an OTNSec policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 11 15:16:58.417 UTC
RP/0/RP0/CPU0:ios(config)#otnsec policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec-policy)#cipher-suite AES-GCM-256
RP/0/RP0/CPU0:ios(config-otnsec-policy)#security-policy must-secure
RP/0/RP0/CPU0:ios(config-otnsec-policy)#sak-rekey-interval 120
RP/0/RP0/CPU0:ios(config-otnsec-policy)#commit
```

The following is a sample of an OTNSec policy.

```
RP/0/RP0/CPU0:ios#show run otnsec policy otnsec-policy1
Tue Mar 12 11:14:03.591 UTC
otnsec policy otnsec-policy1
  cipher-suite AES-GCM-256
  security-policy must-secure
  sak-rekey-interval 120
!
```

security-policy

To specify the security for OTNSec policy, use the **security-policy** command in OTNSec policy configuration mode.

security-policy *must-secure*

Syntax Description	must-secure Mandatory security for OTNSec.
---------------------------	---

Command Default	None				
Command Modes	OTNSec policy configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which an OTNSec policy is configured.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 11 15:16:58.417 UTC
RP/0/RP0/CPU0:ios(config)#otnsec policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec-policy)#cipher-suite AES-GCM-256
RP/0/RP0/CPU0:ios(config-otnsec-policy)#security-policy must-secure
RP/0/RP0/CPU0:ios(config-otnsec-policy)#sak-rekey-interval 120
RP/0/RP0/CPU0:ios(config-otnsec-policy)#commit
```

The following is a sample of an OTNSec policy.

```
RP/0/RP0/CPU0:ios#show run otnsec policy otnsec-policy1
Tue Mar 12 11:14:03.591 UTC
otnsec policy otnsec-policy1
  cipher-suite AES-GCM-256
  security-policy must-secure
  sak-rekey-interval 120
!
```

session-id

To configure the session ID for OTNSec on ODU4 controller, use the **session-id** command in OTNSec configuration mode.

session-id *session-id*

Syntax Description	<i>session-id</i> Session ID. The range is from 1 to 65535.				
Command Default	None				
Command Modes	OTNSec configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				

Example

The following is a sample in which OTNSec is configured on ODU4 controllers.

```
RP/0/RP0/CPU0:ios#configure
Mon Mar 12 12:10:21.374 UTC
RP/0/RP0/CPU0:ios(config)#controller ODU4 0/1/0/0/1
RP/0/RP0/CPU0:ios(config-odu4)#otnsec
RP/0/RP0/CPU0:ios(config-otnsec)#source ipv4 10.0.0.1
RP/0/RP0/CPU0:ios(config-otnsec)#destination ipv4 10.0.0.2
RP/0/RP0/CPU0:ios(config-otnsec)#session-id 9000
RP/0/RP0/CPU0:ios(config-otnsec)#policy otnsec-policy1
RP/0/RP0/CPU0:ios(config-otnsec)#ikev2 profile profile1
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#commit
Mon Mar 12 12:14:17.609 UTC
RP/0/RP0/CPU0:ios(config-ikev2-profile-profile1)#exit
RP/0/RP0/CPU0:ios(config)#exit
```

The following is a running configuration on an ODU4 controller.

```
RP/0/RP0/CPU0:ios#show run controller ODU4 0/1/0/0/1
Tue Mar 12 12:20:49.153 UTC
controller ODU40/1/0/0/1
  gcc2
  otnsec
    policy otnsec-policy1
    source ipv4 10.0.0.1
    destination ipv4 10.0.0.2
    session-id 9000
  !
!
```

show alarms

To display alarms in brief or detail, use the **show alarms** command in XR EXEC mode or Administration EXEC mode.

show alarms brief [**card** [**location** *location*] | **rack** | **system**] [**active** | **history**]]

show alarms detail [**card** [**location** *location*] | **rack** | **system**] [**active** | **clients** | **history** | **stats**]]

Syntax	Description
brief	Displays alarms in brief.
card	Displays card scope alarms related data.
rack	Displays rack scope alarms related data.
system	Displays system scope alarms related data.
location <i>location</i>	Specifies the target location in the <i>rack/slot</i> notation.
active	Displays active alarms.
history	Displays alarm history.
detail	Displays alarms in detail.

clients	Displays clients associated with the service.
----------------	---

stats	Displays service statistics.
--------------	------------------------------

Command Default

None

Command Modes

XR EXEC

Administration EXEC

Command History

Release	Modification
Release 7.0.1	This command was introduced.

Usage Guidelines

This command displays the alarms in brief or detail. The command displays only the administration alarms in admin EXEC mode and all the alarms in XR EXEC mode.

Example

The following example shows the output of the **show alarms** command.

```
sysadmin-vm:0_RP0# show alarms
```

```
Wed Mar 20 05:25:53.146 UTC+00:00
```

```
-----
Active Alarms
-----
```

Location	Severity	Group	Set time	Description
0/PM0 Disabled	major	environ	03/19/19 21:37:29	Power Module Output
0 lost.	major	environ	03/19/19 21:37:35	Power Module redundancy

```
Wed Mar 20 05:26:52.116 UTC
```

```
-----
Active Alarms
-----
```

Location	Severity	Group	Set Time	Description
0/PM0 Need Upgrade	Major	FPD_Infra	03/19/2019 21:39:04 UTC	One Or More FPDs
State				Or Not In Current

show controllers

To display status and configuration information about the interfaces on a specific node, use the **show controllers** command in XR EXEC mode.

```
show controllers controllertype R/S/I/P [ pm { current | history } { 30 sec | 15-min | 24-hour } { optics | ether | pcs | prbs } linenumber { otn | fec } ] [ fastpoll ]
```

To view the the bits-per-symbol or baud rate of the optics controller for a specific range use the following command:

```
show controllers optics R/S/I/P { bps-range bps-range | baud-rate-range baud-range } | include data-rate | include fec-type
```

Syntax Description

<i>controllertype</i>	Type of the controller. The possible values are HundredGigEctrlr, CoherentDSP, ODU4, and Optics.
<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the controller.
pm	Displays performance monitoring parameters for the controller.
current	Displays the current performance monitoring data in 30 second, 15 minute, and 24-hour intervals.
history	Displays the historical performance monitoring data in 30 second, 15 minute, and 24-hour intervals.
optics ether pcs prbs	optics to display the PM data for Optics controller, ether, pcs, and prbs to display the PM data for Ethernet controller.
<i>linenumber</i>	Line number to display performance monitoring data. The range is 1–4.
otn fec	Displays OTN PM data or FEC PM data for CoherentDSP controller.
bps-range <i>bps-range</i>	Displays the BPS for the specified range.
baud-rate-range <i>baud-range</i>	Displays the baud rates for the specified range.
include	Filters the show command output so that it displays only lines that contain a particular regular expression.
<i>data-rates</i>	Data rate for which the BPS or baud rate is displayed.
<i>fec-type</i>	FEC type for which the BPS or baud rate is displayed.
fastpoll	The fastpoll data is displayed.

Usage Guidelines

The following table describes the PRBS parameters.

Parameter	Description
EBC	Cumulative count of PRBS bit errors in the sampling window (15 min or 24 hour). Bit errors are accumulated only if PRBS signal is locked.
FOUND-COUNT	Number of state transitions from signal unlocked state to locked state in the sampling window. If no state change is observed in the interval, the count will be zero.

Parameter	Description
LOST-COUNT	Number of state transitions from signal locked state to signal unlocked state in the sampling window. If there is no state change observed in the interval, the count is zero.
FOUND-AT-TS	Latest timestamp when the PRBS state switches from unlocked state to locked state in the sampling window. If no state change is observed in the sampling window, this value is null.
LOST-AT-TS	Latest timestamp when the PRBS state switches from locked state to unlocked state in the sampling window. If no state change is observed in the sampling window, this value is null.
CONFIG-PTRN	Configured PRBS pattern on the port.

- Total TX Power and Total RX Power: For multi-lane controller optics, total power is calculated by converting each lane power value from dBm to mW, and adding each lane power. Total power in mW must then be converted to dBm.

Total power in mW = [(Lane 1 power in mW) + (Lane 2 power in mW) + (Lane 3 power in mW) + (Lane 4 power in mW)]

Total power in dBm = Converted value of total power in mW to dBm

Command Default

The status and configuration information of all the interfaces is displayed.

Command Modes

XR EXEC

Command History

Release	Modification
7.0.1	This command was introduced.
7.1.1	pcs keyword was added.
7.3.1	The keyword fastpoll was added.

Examples

The following is a sample to view the laser squelch status on the Ethernet controller.

RP/0/RP0/CPU0:ios#**show controller HundredGigECtrlr 0/1/0/10**

```
RP/0/RP0/CPU0:ios#show controller HundredGigECtrlr 0/1/0/10
Fri Feb 22 15:18:47.011 UTC
Operational data for interface HundredGigECtrlr0/1/0/10:
```

State:

```
Administrative state: enabled
Operational state: Up
LED state: Green On
Maintenance: Disabled
AINS Soak: None
Total Duration: 0 hour(s) 0 minute(s)
Remaining Duration: 0 hour(s) 0 minute(s) 0 second(s)
```

Laser Squelch: Enabled

```
Phy:
  Media type: Not known
  Statistics:
    FEC:
      Corrected Codeword Count: 0
      Uncorrected Codeword Count: 0
```

Autonegotiation disabled.

```
Operational values:
  Speed: 100Gbps
  Duplex: Full Duplex
  Flowcontrol: None
  Loopback: None (or external)
  BER monitoring:
    Not supported
  Forward error correction: Standard (Reed-Solomon)
  Holdoff Time: 0ms
```

The following is a sample to view the hold off timer configured on the ethernet controller.

RP/0/RP0/CPU0:ios#show controller HundredGigECtrlr 0/1/0/10

```
Fri Feb 22 18:58:06.888 UTC
Operational data for interface HundredGigECtrlr0/1/0/10:

State:
  Administrative state: enabled
  Operational state: Up
  LED state: Green On
  Maintenance: Disabled
  AINS Soak: None
    Total Duration: 0 hour(s) 0 minute(s)
    Remaining Duration: 0 hour(s) 0 minute(s) 0 second(s)
  Laser Squelch: Enabled

Phy:
  Media type: Not known
  Statistics:
    FEC:
      Corrected Codeword Count: 0
      Uncorrected Codeword Count: 0
```

Autonegotiation disabled.

```
Operational values:
  Speed: 100Gbps
  Duplex: Full Duplex
  Flowcontrol: None
  Loopback: None (or external)
  BER monitoring:
    Not supported
  Forward error correction: Standard (Reed-Solomon)
  Holdoff Time: 3000ms
```

The following is a sample to view the loopback configured on the ethernet controller.

RP/0/RP0/CPU0:ios#show controller HundredGigECtrlr 0/1/0/10

```
Fri Feb 22 20:01:00.521 UTC
Operational data for interface HundredGigECtrlr0/1/0/10:
```

```

State:
  Administrative state: enabled
  Operational state: Up
  LED state: Green On
  Maintenance: Enabled
  AINS Soak: Pending
    Total Duration: 0 hour(s) 30 minute(s)
    Remaining Duration: 0 hour(s) 30 minute(s) 0 second(s)
  Laser Squelch: Enabled

Phy:
  Media type: Not known
  Statistics:
    FEC:
      Corrected Codeword Count: 0
      Uncorrected Codeword Count: 6

Autonegotiation disabled.

Operational values:
  Speed: 100Gbps
  Duplex: Full Duplex
  Flowcontrol: None
Loopback: Line
  BER monitoring:
    Not supported
  Forward error correction: Standard (Reed-Solomon)
  Holdoff Time: 0ms

```

The following example displays the optics controller statistics with AINS Soak in running state.

RP/0/RP0/CPU0:ios#**show controller optics 0/1/0/3**

```

Thu Feb 21 19:45:41.088 UTC

Controller State: Up

Transport Admin State: Automatic In Service

Laser State: On

LED State: Green

Optics Status

  Optics Type: Grey optics

  Alarm Status:
  -----
  Detected Alarms: None

  LOS/LOL/Fault Status:

  Alarm Statistics:
  -----
  HIGH-RX-PWR = 0          LOW-RX-PWR = 0
  HIGH-TX-PWR = 0          LOW-TX-PWR = 0
  HIGH-LBC = 0             HIGH-DGD = 0
  OOR-CD = 0               OSNR = 0
  WVL-OOL = 0              MEA = 0
  IMPROPER-REM = 0

```

TX-POWER-PROV-MISMATCH = 0

Performance Monitoring: Enable

THRESHOLD VALUES

Parameter	High Alarm	Low Alarm	High Warning	Low Warning
Rx Power Threshold(dBm)	4.9	-12.0	0.0	0.0
Tx Power Threshold(dBm)	3.5	-10.1	0.0	0.0
LBC Threshold(mA)	N/A	N/A	0.00	0.00

LBC High Threshold = 98 %

Polarization parameters not supported by optics

Total TX Power = 6.39 dBm

Total RX Power = 5.85 dBm

Lane	Laser Bias	TX Power	RX Power	Output Frequency
1	75.0 %	0.59 dBm	0.63 dBm	230.43 THz
2	68.6 %	0.06 dBm	-0.68 dBm	230.43 THz
3	69.0 %	0.26 dBm	-0.63 dBm	230.43 THz
4	69.1 %	0.56 dBm	-0.10 dBm	230.43 THz

Transceiver Vendor Details

```

Form Factor      : QSFP28
Name             : CISCO-FINISAR
Part Number      : FTLCL1152RGPL-C2
Rev Number       : CISCO-FINISAR
Serial Number    : FNS22150LEC
PID              : QSFP-100G-CWDM4-S
VID              : V02
CISCO-FINISAR
Date Code(yy/mm/dd) : 18/04/11
Fiber Connector Type: LC
Sonet Application Code: Not Set
Ethernet Compliance Code: 100GBASE-CWDM4

```

Transceiver Temperature : 32 Celsius

```

AINS Soak      : Running
AINS Timer     : 0h, 15m
AINS remaining time : 771 seconds

```

The following is a sample to view the current performance monitoring parameters of the optics controller in 15-minute intervals.

RP/0/RP0/CPU0:ios#show controller optics 0/1/0/3 pm current 15-min optics 3

Sat Feb 9 19:33:42.480 UTC

Optics in the current interval [19:30:00 - 19:33:42 Sat Feb 9 2019]

Optics current bucket type : Valid

MIN	AVG	MAX	Operational	Configured	TCA	Operational
Configured	TCA		Threshold(min)	Threshold(min)	(min)	Threshold(max)
Threshold(max)	(max)					

```

LBC[% ]      : 0.0      0.0      0.0      0.0      NA      NO      100.0
               NA      NO
OPT[dBm]     : -40.00   -40.00   -40.00   -30.00   NA      NO      63.32
               NA      NO
OPR[dBm]     : -40.00   -40.00   -40.00   -30.00   NA      NO      63.32
               NA      NO
FREQ_OFF[Mhz]: 0        0        0        0        NA      NO      0
               NA      NO

```

The following is a sample to view the current performance monitoring parameters of the Coherent DSP controller in 15-minute intervals.

RP/0/RP0/CPU0:ios#show controller coherentDSP 0/2/0/1 pm current 15-min fec

Sat Feb 9 11:23:42.196 UTC

g709 FEC in the current interval [11:15:00 - 11:23:42 Sat Feb 9 2019]

FEC current bucket type : Valid

EC-BITS : 291612035786 Threshold : 903330 TCA(enable) :

YES

UC-WORDS : 0 Threshold : 5 TCA(enable) :

YES

	MIN	AVG	MAX	Threshold	TCA	Threshold	TCA
				(min)	(enable)	(max)	(enable)
PreFEC BER :	7.1E-03	7.2E-03	8.1E-03	0E-15	NO	0E-15	NO
PostFEC BER :	0E-15	0E-15	0E-15	0E-15	NO	0E-15	NO

The following is a sample of an encryption configuration on an ODU4 controller.

RP/0/RP0/CPU0:ios#show controllers ODU4 0/1/0/0/1 otnsec

Tue Mar 12 17:34:50.660 UTC

```

Controller Name      : ODU4 0/1/0/0/1
Source ip            : 10.0.0.1
Destination ip       : 10.0.0.2
Session id           : 9000
IKEv2 profile        : Not Configured
Session State        : SECURED

```

```

Otnsec policy name   : otnsec-policy1
  cipher-suite        : AES-GCM-256
  security-policy     : Must Secure
  sak-rekey-interval  : 120
Time to rekey        : 0

```

```

Programming Status   :
  Inbound SA(Rx)     :
    AN[0]             :
      SPI              : None
  Outbound SA(Tx)    :
    AN[0]             :
      SPI              : None

```

The following is a sample to view the summary of all the ODU4 controllers.

RP/0/RP0/CPU0:ios#show controller ODU4 * otnsec summary

show controllers

Tue Mar 12 15:18:26.299 IST

Controller Name State	Source ip	Destination ip	Session id	Session
ODU4 0/0/0/0/1	1.1.1.1	1.1.1.2	1	SECURED
ODU4 0/0/0/0/2	1.1.1.1	1.1.1.2	2	SECURED
ODU4 0/0/0/0/3	1.1.1.1	1.1.1.2	3	SECURED
ODU4 0/0/0/0/4	1.1.1.1	1.1.1.2	4	SECURED
ODU4 0/0/0/0/5	1.1.1.1	1.1.1.2	5	SECURED
ODU4 0/0/0/1/1	1.1.2.1	1.1.2.2	6	SECURED
ODU4 0/0/0/1/2	1.1.2.1	1.1.2.2	7	SECURED
ODU4 0/0/0/1/3	1.1.2.1	1.1.2.2	8	SECURED
ODU4 0/0/0/1/4	1.1.2.1	1.1.2.2	9	SECURED
ODU4 0/0/0/1/5	1.1.2.1	1.1.2.2	10	SECURED
ODU4 0/1/0/0/1	1.1.3.1	1.1.3.2	11	SECURED
ODU4 0/1/0/0/2	1.1.3.1	1.1.3.2	12	SECURED
ODU4 0/1/0/0/3	1.1.3.1	1.1.3.2	13	SECURED
ODU4 0/1/0/0/4	1.1.3.1	1.1.3.2	14	SECURED
ODU4 0/1/0/0/5	1.1.3.1	1.1.3.2	15	SECURED
ODU4 0/1/0/1/1	1.1.4.1	1.1.4.2	16	SECURED
ODU4 0/1/0/1/2	1.1.4.1	1.1.4.2	17	SECURED
ODU4 0/1/0/1/3	1.1.4.1	1.1.4.2	18	SECURED
ODU4 0/1/0/1/4	1.1.4.1	1.1.4.2	19	SECURED
ODU4 0/1/0/1/5	1.1.4.1	1.1.4.2	20	SECURED
ODU4 0/2/0/0/1	1.1.5.1	1.1.5.2	21	SECURED
ODU4 0/2/0/0/2	1.1.5.1	1.1.5.2	22	SECURED
ODU4 0/2/0/0/3	1.1.5.1	1.1.5.2	23	SECURED
ODU4 0/2/0/0/4	1.1.5.1	1.1.5.2	24	SECURED
ODU4 0/2/0/0/5	1.1.5.1	1.1.5.2	25	SECURED
ODU4 0/2/0/1/1	1.1.6.1	1.1.6.2	26	SECURED
ODU4 0/2/0/1/2	1.1.6.1	1.1.6.2	27	SECURED
ODU4 0/2/0/1/3	1.1.6.1	1.1.6.2	28	SECURED
ODU4 0/2/0/1/4	1.1.6.1	1.1.6.2	29	SECURED
ODU4 0/2/0/1/5	1.1.6.1	1.1.6.2	30	SECURED
ODU4 0/3/0/0/1	1.1.7.1	1.1.7.2	31	SECURED
ODU4 0/3/0/0/2	1.1.7.1	1.1.7.2	32	SECURED
ODU4 0/3/0/0/3	1.1.7.1	1.1.7.2	33	SECURED
ODU4 0/3/0/0/4	1.1.7.1	1.1.7.2	34	SECURED
ODU4 0/3/0/0/5	1.1.7.1	1.1.7.2	35	SECURED
ODU4 0/3/0/1/1	1.1.8.1	1.1.8.2	36	SECURED
ODU4 0/3/0/1/2	1.1.8.1	1.1.8.2	37	SECURED
ODU4 0/3/0/1/3	1.1.8.1	1.1.8.2	38	SECURED
ODU4 0/3/0/1/4	1.1.8.1	1.1.8.2	39	SECURED
ODU4 0/3/0/1/5	1.1.8.1	1.1.8.2	40	SECURED

The following is a sample to view the PM statistics for encryption.

RP/0/RP0/CPU0:ios#show controllers ODU4 0/1/0/0/1 pm current 30-sec otnsec

Tue Mar 12 15:19:33.371 IST

OTNSec in the current interval [15:19:30 - 15:19:33 Tue Mar 12 2019]

OTNSEC current bucket type : Valid

InBlocks	: 0	Threshold : 0	TCA(enable)
: No			
InBlocksEnc	: 0	Threshold : 0	TCA(enable)
: No			
InBlocksUnEncrypted	: 0	Threshold : 0	TCA(enable)
: No			
InBlocksProtected	: 0	Threshold : 0	TCA(enable)
: No			
InBlocksUnProtected	: 0	Threshold : 0	TCA(enable)
: No			

```

InBlocksSequenceErrors : 0                      Threshold : 0                      TCA(enable)
: No
InBlocksReplayErrors    : 0                      Threshold : 0                      TCA(enable)
: No
InBlocksAuthErrors      : 0                      Threshold : 0                      TCA(enable)
: No
InBlocksZeroed          : 0                      Threshold : 0                      TCA(enable)
: No
OutBlocks               : 3425548                Threshold : 0                      TCA(enable)
: No
OutBlocksEnc            : 3425548                Threshold : 0                      TCA(enable)
: No
OutBlocksUnEncrypted    : 0                      Threshold : 0                      TCA(enable)
: No
OutBlocksSequenceErrors: 0                      Threshold : 0                      TCA(enable)
: No
OutBlocksZeroed        : 0                      Threshold : 0                      TCA(enable)
: No
Last clearing of "show controllers ODU" counters never

```

The following is a sample to view the current performance monitoring parameters for the ethernet controller in 30-second intervals.

RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 0/0/0/2 pm current 30-sec pcs

Tue Nov 19 09:17:26.684 UTC

Ethernet PCS in the current interval [09:17:00 - 09:17:26 Tue Nov 19 2019]

```

Ethernet PCS current bucket type : Valid
BIP[00] : 0 Threshold : 0 TCA(enable) : NO
BIP[01] : 0 Threshold : 0 TCA(enable) : NO
BIP[02] : 0 Threshold : 0 TCA(enable) : NO
BIP[03] : 0 Threshold : 0 TCA(enable) : NO
BIP[04] : 0 Threshold : 0 TCA(enable) : NO
BIP[05] : 0 Threshold : 0 TCA(enable) : NO
BIP[06] : 0 Threshold : 0 TCA(enable) : NO
BIP[07] : 0 Threshold : 0 TCA(enable) : NO
BIP[08] : 0 Threshold : 0 TCA(enable) : NO
BIP[09] : 0 Threshold : 0 TCA(enable) : NO
BIP[10] : 0 Threshold : 0 TCA(enable) : NO
BIP[11] : 0 Threshold : 0 TCA(enable) : NO
BIP[12] : 0 Threshold : 0 TCA(enable) : NO
BIP[13] : 0 Threshold : 0 TCA(enable) : NO
BIP[14] : 0 Threshold : 0 TCA(enable) : NO
BIP[15] : 0 Threshold : 0 TCA(enable) : NO
BIP[16] : 0 Threshold : 0 TCA(enable) : NO
BIP[17] : 0 Threshold : 0 TCA(enable) : NO
BIP[18] : 0 Threshold : 0 TCA(enable) : NO
BIP[19] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[00] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[01] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[02] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[03] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[04] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[05] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[06] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[07] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[08] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[09] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[10] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[11] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[12] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[13] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[14] : 0 Threshold : 0 TCA(enable) : NO

```

show controllers

```

FRM-ERR[15] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[16] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[17] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[18] : 0 Threshold : 0 TCA(enable) : NO
FRM-ERR[19] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[00] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[01] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[02] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[03] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[04] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[05] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[06] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[07] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[08] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[09] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[10] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[11] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[12] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[13] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[14] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[15] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[16] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[17] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[18] : 0 Threshold : 0 TCA(enable) : NO
BAD-SH[19] : 0 Threshold : 0 TCA(enable) : NO
ES : 0 Threshold : 0 TCA(enable) : NO
SES : 0 Threshold : 0 TCA(enable) : NO
UAS : 0 Threshold : 0 TCA(enable) : NO
ES-FE : 0 Threshold : 0 TCA(enable) : NO
SES-FE : 0 Threshold : 0 TCA(enable) : NO
UAS-FE : 0 Threshold : 0 TCA(enable) : NO

```

Last clearing of "show controllers ETHERNET " counters never
 RP/0/RP0/CPU0:ios#

The following is a sample to view the historical performance monitoring parameters for Ethernet controller in 30-second intervals.

RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 0/0/0/2 pm history 30-sec pcs 1

Tue Nov 19 09:27:49.169 UTC

Ethernet PCS in the current interval [09:27:00 - 09:27:30 Tue Nov 19 2019]

Ethernet PCS current bucket type : Valid

```

BIP[00] : 0
BIP[01] : 0
BIP[02] : 0
BIP[03] : 0
BIP[04] : 0
BIP[05] : 0
BIP[06] : 0
BIP[07] : 0
BIP[08] : 0
BIP[09] : 0
BIP[10] : 0
BIP[11] : 0
BIP[12] : 0
BIP[13] : 0
BIP[14] : 0
BIP[15] : 0
BIP[16] : 0
BIP[17] : 0
BIP[18] : 0
BIP[19] : 0

```

```

FRM-ERR[00] : 0
FRM-ERR[01] : 0
FRM-ERR[02] : 0
FRM-ERR[03] : 0
FRM-ERR[04] : 0
FRM-ERR[05] : 0
FRM-ERR[06] : 0
FRM-ERR[07] : 0
FRM-ERR[08] : 0
FRM-ERR[09] : 0
FRM-ERR[10] : 0
FRM-ERR[11] : 0
FRM-ERR[12] : 0
FRM-ERR[13] : 0
FRM-ERR[14] : 0
FRM-ERR[15] : 0
FRM-ERR[16] : 0
FRM-ERR[17] : 0
FRM-ERR[18] : 0
FRM-ERR[19] : 0
BAD-SH[00] : 0
BAD-SH[01] : 0
BAD-SH[02] : 0
BAD-SH[03] : 0
BAD-SH[04] : 0
BAD-SH[05] : 0
BAD-SH[06] : 0
BAD-SH[07] : 0
BAD-SH[08] : 0
BAD-SH[09] : 0
BAD-SH[10] : 0
BAD-SH[11] : 0
BAD-SH[12] : 0
BAD-SH[13] : 0
BAD-SH[14] : 0
BAD-SH[15] : 0
BAD-SH[16] : 0
BAD-SH[17] : 0
BAD-SH[18] : 0
BAD-SH[19] : 0
ES : 0
SES : 0
UAS : 0
ES-FE : 0
SES-FE : 0
UAS-FE : 0

```

Last clearing of "show controllers ETHERNET " counters never
RP/0/RP0/CPU0:ios#

The following is a sample to view the Pseudo Random Binary Sequence (PRBS) performance monitoring parameters on the coherentDSP controller.

RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/1 pm current 15-min prbs

```

Mon Feb 13 00:58:48.327 UTC
PRBS in the current interval [00:45:00 - 00:58:48 Mon Feb 13 2019]
PRBS current bucket type : Valid
EBC : 40437528165
FOUND-COUNT : 1 FOUND-AT-TS : 00:51:22 Mon Feb 13 2019
LOST-COUNT : 1 LOST-AT-TS : 00:52:52 Mon Feb 13 2019
CONFIG-PTRN : PRBS_PATTERN_PN31
Last clearing of "show controllers OTU" counters never

```

The following is a sample to view the fastpoll data using the show controller optics fastpoll command:

show controllers

```
RP/0/RP0/CPU0:G_BLR#sh controllers optics 0/0/0/0 fastpoll
Thu Mar  4 07:36:06.479 UTC
```

Index Param3	Timestamp	Interval (in msec)	SOP Param1	SOP Param2	SOP
323997	1614843319774376	71	0.75634020566940308	0.65416425466537476	
0.00256355479359627					
323997	1614843319842376	68	0.73894464969635010	0.67360454797744751	
-0.01290932949632406					
323997	1614843319911376	69	0.74565875530242920	0.66615802049636841	
0.01333658862859011					
323997	1614843319979376	68	0.75981932878494263	0.64986115694046021	
-0.01788384653627872					
323997	1614843320034376	55	0.75841546058654785	0.65172278881072998	
-0.00027466658502817					
323997	1614843320091376	57	0.75084686279296875	0.66032898426055908	
-0.01101718191057444					
323997	1614843320146376	55	0.74700152873992920	0.66475415229797363	
-0.00756859034299850					
323997	1614843320201376	55	0.74233222007751465	0.66988128423690796	
0.01202429272234440					
323997	1614843320259376	58	0.75130468606948853	0.65990173816680908	
0.00363170262426138					
323997	1614843320316376	57	0.75209814310073853	0.65892511606216431	
-0.01126132998615503					
323997	1614843320372376	56	0.74962615966796875	0.66182440519332886	
0.00259407330304384					
323997	1614843320427376	55	0.75087738037109375	0.66035950183868408	
-0.00869777519255877					
323997	1614843320483376	56	0.75930052995681763	0.65068513154983521	
-0.00244148075580597					

The following is a sample to view the 8QAM modulation on the 200G muxponder mode for the OTN-XP card.

```
RP/0/RP0/CPU0:ios#show controllers optics 0/1/0/12
```

```
Wed Jun  2 17:17:29.652 UTC
```

```
Controller State: Up
```

```
Transport Admin State: In Service
```

```
Laser State: On
```

```
LED State: Green
```

```
Optics Status
```

```
Optics Type: <Unknown> DWDM
```

```
DWDM carrier Info: C BAND, MSA ITU Channel=61, Frequency=193.10THz,
```

```
Wavelength=1552.524nm
```

```
Alarm Status:
```

```
-----
```

```
Detected Alarms: None
```

```
LOS/LOL/Fault Status:
```

```
Alarm Statistics:
```

```
-----
```

```
HIGH-RX-PWR = 0
```

```
HIGH-TX-PWR = 0
```

```
HIGH-LBC = 0
```

```
OOB-CD = 0
```

```
LOW-RX-PWR = 1
```

```
LOW-TX-PWR = 1
```

```
HIGH-DGD = 0
```

```
OSNR = 1
```

```

WVL-OOL = 0           MEA = 0
IMPROPER-REM = 0
TX-POWER-PROV-MISMATCH = 0
Laser Bias Current = 0.0 %
Actual TX Power = 0.97 dBm
RX Power = 1.47 dBm
RX Signal Power = 17.67 dBm
Frequency Offset = 82 MHz

```

Performance Monitoring: Enable

THRESHOLD VALUES

Parameter	High Alarm	Low Alarm	High Warning	Low Warning
Rx Power Threshold(dBm)	3.0	-31.5	0.0	0.0
Tx Power Threshold(dBm)	3.0	-12.0	0.0	0.0
LBC Threshold(mA)	N/A	N/A	0.00	0.00

```

LBC High Threshold = 90 %
Configured Tx Power = 1.00 dBm
Configured CD High Threshold = 96000 ps/nm
Configured CD lower Threshold = -96000 ps/nm
Configured OSNR lower Threshold = 13.70 dB
Configured DGD Higher Threshold = 67.00 ps
Baud Rate = 42.2082633972 GBd
Bits per Symbol = 3.0000000000 bits/symbol
Modulation Type: 8QAM
Chromatic Dispersion 2 ps/nm
Configured CD-MIN -48000 ps/nm CD-MAX 48000 ps/nm
Polarization Mode Dispersion = 0.0 ps
Second Order Polarization Mode Dispersion = 72.00 ps^2
Optical Signal to Noise Ratio = 34.10 dB
SNR = 18.40 dB
Polarization Dependent Loss = 1.20 dB
Polarization Change Rate = 0.00 rad/s
Differential Group Delay = 2.00 ps

```

Transceiver Vendor Details

```

Form Factor           : Not set
Fiber Connector Type: Not Set
Otn Application Code: Not Set
Sonet Application Code: Not Set
Ethernet Compliance Code: Not set

```

Transceiver Temperature : 46 Celsius

```

AINS Soak           : None
AINS Timer          : 0h, 0m
AINS remaining time  : 0 seconds

```

The following sample verifies the alarm correlation on the inverse muxponder configuration on the OTN-XP card. When trunk port 12 is shut down, LOS alarm is raised and the trunk port 13 also goes down.

```

RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/12
Thu Sep 30 14:12:54.604 UTC

```

```

Port                                     : CoherentDSP 0/2/0/12

```

show controllers

```

Controller State                : Down
Inherited Secondary State      : Normal
Configured Secondary State     : Normal
Derived State                  : In Service
Loopback mode                  : None
BER Thresholds                 : SF = 1.0E-5  SD = 1.0E-7
Performance Monitoring         : Enable
Bandwidth                      : 200.0Gb/s

```

Alarm Information:

```

LOS = 2 LOF = 0 LOM = 0
OOF = 1 OOM = 0 AIS = 1
IAE = 0 BIAE = 0          SF_BER = 0
SD_BER = 0          BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0  FLEXO_GIDM = 0
FLEXO-MM = 0  FLEXO-LOM = 0  FLEXO-RDI = 1
FLEXO-LOF = 0
Detected Alarms                : LOS

```

Bit Error Rate Information

```

PREFEC BER                     : 0.00E+00
POSTFEC BER                    : 0.00E+00
Q-Factor                       : 0.00 dB

```

```

Q-Margin                       : 0.00dB

```

TTI :

```

    Remote IP addr             : 0.0.0.0

```

```

FEC mode                       : O_FEC

```

```

Flexo-Mode                    : Enable

```

Flexo Details:

```

    Tx GID                    : 1
    TX IID                    : 1, 2,
    Rx GID                    : 0
    RX IID                    : 0, 0,

```

Flexo Peers Information:

```

    Controller                : CoherentDSP0_2_0_13
    OTUCn rate                 : OTUC2

```

```

AINS Soak                     : None
AINS Timer                    : 0h, 0m
AINS remaining time           : 0 seconds

```

```

RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/13

```

```

Thu Sep 30 14:12:59.330 UTC

```

```

Port                          : CoherentDSP 0/2/0/13
Controller State              : Down
Inherited Secondary State     : Normal
Configured Secondary State    : Normal
Derived State                 : In Service
Loopback mode                 : None
BER Thresholds                : SF = 1.0E-5  SD = 1.0E-7
Performance Monitoring        : Enable
Bandwidth                     : 200.0Gb/s

```

Alarm Information:

```

LOS = 1 LOF = 0 LOM = 0
OOF = 0 OOM = 0 AIS = 0

```

```

IAE = 0 BIAE = 0          SF_BER = 0
SD_BER = 0          BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0      FLEXO_GIDM = 0
FLEXO-MM = 0      FLEXO-LOM = 0  FLEXO-RDI = 1
FLEXO-LOF = 0
Detected Alarms                      : None

Bit Error Rate Information
  PREFEC BER                        : 0.00E+00
  POSTFEC BER                      : 0.00E+00
  Q-Factor                        : 15.80 dB

Q-Margin                            : 9.50dB

TTI :
      Remote IP addr                : 0.0.0.0

FEC mode                            : O_FEC

Flexo-Mode                          : Enable
Flexo Details:
  Tx GID                           : 1
  TX IID                           : 3, 4,
  Rx GID                           : 1
  RX IID                           : 3, 4,

Flexo Peers Information:
  Controller                        : CoherentDSP0_2_0_12
  OTUCn rate                       : OTUC2

AINS Soak                          : None
AINS Timer                         : 0h, 0m
AINS remaining time                : 0 seconds

```

The following sample verifies the loopback on the inverse muxponder configuration on the OTN-XP card:

```

RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/12
Thu Sep 30 14:17:04.411 UTC

```

```

Port                                : CoherentDSP 0/2/0/12
Controller State                    : Up
Inherited Secondary State           : Normal
Configured Secondary State          : Maintenance
Derived State                       : Maintenance
Loopback mode                      : Internal
BER Thresholds                     : SF = 1.0E-5  SD = 1.0E-7
Performance Monitoring              : Enable
Bandwidth                          : 200.0Gb/s

Alarm Information:
LOS = 2 LOF = 0 LOM = 0
OOF = 1 OOM = 0 AIS = 1
IAE = 0 BIAE = 0          SF_BER = 0
SD_BER = 0          BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0      FLEXO_GIDM = 0
FLEXO-MM = 0      FLEXO-LOM = 0  FLEXO-RDI = 1
FLEXO-LOF = 0
Detected Alarms                      : None

Bit Error Rate Information
  PREFEC BER                        : 2.46E-08

```

show controllers

```

POSTFEC BER                               : 0.00E+00
Q-Factor                                  : 14.60 dB

Q-Margin                                  : 8.30dB

TTI :
    Remote hostname                        : ios
    Remote interface                      : CoherentDSP 0/2/0/12
    Remote IP addr                        : 0.0.0.0

FEC mode                                  : O_FEC

Flexo-Mode                               : Enable
Flexo Details:
    Tx GID                               : 1
    TX IID                               : 1, 2,
    Rx GID                               : 1
    RX IID                               : 1, 2,

Flexo Peers Information:
    Controller                           : CoherentDSP0_2_0_13
    OTUCn rate                           : OTUC2

AINS Soak                                : None
AINS Timer                               : 0h, 0m
AINS remaining time                      : 0 seconds

RP/0/RP0/CPU0:ios#sh controllers coherentDSP 0/2/0/13
Thu Sep 30 14:17:08.140 UTC

Port                                     : CoherentDSP 0/2/0/13
Controller State                         : Up
Inherited Secondary State                : Normal
Configured Secondary State               : Maintenance
Derived State                            : Maintenance
Loopback mode                           : Internal
BER Thresholds                           : SF = 1.0E-5   SD = 1.0E-7
Performance Monitoring                   : Enable
Bandwidth                                : 200.0Gb/s

Alarm Information:
LOS = 1 LOF = 0 LOM = 0
OOF = 0 OOM = 0 AIS = 0
IAE = 0 BIAE = 0          SF_BER = 0
SD_BER = 0          BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0      FLEXO_GIDM = 0
FLEXO-MM = 0      FLEXO-LOM = 0  FLEXO-RDI = 1
FLEXO-LOF = 0
Detected Alarms                          : None

Bit Error Rate Information
PREFEC BER                               : 0.00E+00
POSTFEC BER                              : 0.00E+00
Q-Factor                                  : 15.70 dB

Q-Margin                                  : 9.50dB

TTI :
    Remote IP addr                        : 0.0.0.0

FEC mode                                  : O_FEC

```

```

Flexo-Mode                               : Enable
Flexo Details:
    Tx GID                               : 1
    TX IID                               : 3, 4,
    Rx GID                               : 1
    RX IID                               : 3, 4,

Flexo Peers Information:
    Controller                           : CoherentDSP0_2_0_12
    OTUCn rate                           : OTUC2

AINS Soak                                : None
AINS Timer                               : 0h, 0m
AINS remaining time                      : 0 seconds

```

show access-lists ipv4

To display the contents of current IPv4 access lists, use the **show access-lists ipv4** command in EXEC mode.

show access-lists ipv4 [**interface MgmtEth R/S/I/P** | **maximum** [**detail**] | **summary** [*access-list-name*] | **usage** **pfilter** **location** { **location** *node-id* | **all** } | *access-list-name* [*sequence-number* | **usage** **pfilter** **location** { **location** *node-id* | **all** }]]

Syntax Description	
<i>R/S/I/P</i>	Rack/Slot/Instance/Port/ number of the interface.
<i>access-list-name</i>	(Optional) Name of a particular IPv4 access list. The name cannot contain a space or quotation mark; it may contain numbers.
location <i>number</i>	Location of a particular IPv4 access list.
location <i>node-id</i>	(Optional) Location of a particular IPv4 access list. The node-id argument is entered in the rack/slot/module notation.
usage	(Optional) Displays the usage of the access list on a given line card.
pfilter	(Optional) Displays the packet filtering usage for the specified line card.
summary	Displays a summary of all current IPv4 access lists.
<i>sequence-number</i>	(Optional) Sequence number of a particular IPv4 access list.
maximum	Displays the current maximum number of configurable IPv4 accesscontrol lists (ACLs) and access control entries (ACEs).
detail	(Optional) Displays complete out-of-resource (OOR) details.
all	(Optional) Displays the location of all the line cards.
Command Default	Displays all IPv4 access lists.
Command Modes	EXEC

Command History

Release	Modification
Release 7.0.1	This command is introduced.

Usage Guidelines

Use the **show access-lists ipv4** command to display the contents of all IPv4 access lists. To display the contents of a specific IPv4 access list, use the name argument. Use the *sequence-number* argument to specify the sequence number of the access list.

Use the **show access-lists ipv4 summary** command to display a summary of all current IPv4 access lists. To display a summary of a specific IPv4 access list, use the name argument.

Use the **show access-lists ipv4 maximum detail** command to display the OOR details for IPv4 access lists. OOR limits the number of ACLs and ACEs that can be configured in the system. When the limit is reached, configuration of new ACLs or ACEs is rejected.

Example

In the following example, the contents of all IPv4 access lists are displayed:

RP/0/RP0/CPU0:ios# **show access-lists ipv4**

```
RP/0/RP0/CPU0:ios#show access-lists ipv4
Wed Jan 17 09:52:12.448 IST
ipv4 access-list IPV4_ICMP_DENY
10 deny icmp any any (8 matches)
20 permit ipv4 any any (106 matches)
ipv4 access-list IPV4_ROUTER_FWD_TELNET_TRAFFIC_DENY
10 deny tcp any any eq telnet (3 matches)
20 permit ipv4 any any (6 matches)
```

show access-lists ipv6

To display the contents of current IPv6 access lists, use the **show access-lists ipv6** command in EXEC mode.

show access-lists ipv6 [**interface** **MgmtEth R/S/I/P** | **maximum** [**detail**] | **summary** [*access-list-name*] | **usage** **pfilter location** { **location** *node-id* | **all** } | *access-list-name* [*sequence-number* | **usage** **pfilter location** { **location** *node-id* | **all** }]]

Syntax Description

<i>R/S/I/P</i>	Rack/Slot/Instance/Port/ number of the interface.
<i>access-list-name</i>	(Optional) Name of a particular IPv4 access list. The name cannot contain a space or quotation mark; it may contain numbers.
location <i>number</i>	Location of a particular IPv4 access list.
location <i>node-id</i>	(Optional) Location of a particular IPv4 access list. The node-id argument is entered in the rack/slot/module notation.
usage	(Optional) Displays the usage of the access list on a given line card.
pfilter	(Optional) Displays the packet filtering usage for the specified line card.

summary	Displays a summary of all current IPv4 access lists.
sequence-number	(Optional) Sequence number of a particular IPv4 access list.
maximum	Displays the current maximum number of configurable IPv4 accesscontrol lists (ACLs) and access control entries (ACEs).
detail	(Optional) Displays complete out-of-resource (OOR) details.
all	(Optional) Displays the location of all the line cards.

Command Default Displays all IPv6 access lists.

Command Modes EXEC

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Usage Guidelines The **show access-lists ipv6** command is similar to the **show access-lists ipv4** command, except that it is IPv6 specific.

Use the **show access-lists ipv6** command to display the contents of all IPv6 access lists. To display the contents of a specific IPv6 access list, use the name argument. Use the *sequence-number* argument to specify the sequence number of the access list.

Use the **show access-lists ipv6 summary** command to display a summary of all current IPv6 access lists. To display a summary of a specific IPv6 access list, use the name argument.

Use the **show access-lists ipv6 maximum detail** command to display the OOR details for IPv6 access lists. OOR limits the number of ACLs and ACEs that can be configured in the system. When the limit is reached, configuration of new ACLs or ACEs is rejected.

Example

In the following example, the contents of all IPv6 access lists are displayed:

```
RP/0/RP0/CPU0:ios#show access-lists ipv6
```

```
Wed Jan 17 09:52:14.591 IST
ipv6 access-list IPV6_ROUTER_FWD_TELNET_TRAFFIC_DENY
10 deny tcp any any eq telnet (3 matches)
20 permit ipv6 any any (5 matches)
ipv6 access-list IPV6_SSH_DENY
10 deny tcp any any eq ssh (9 matches)
20 permit ipv6 any any (100 matches)
```

show environment

To display environmental monitor parameters for the system, use the **show environment** command in administration EXEC mode.

show environment [**all** | **fan** | **power** | **voltages** | **current** | **trace** | **temperatures**] [**location** | *location*]

Syntax Description

all	(Optional) Displays information for all the environmental monitor parameters.
fan	(Optional) Displays information about the fans.
power	(Optional) Displays power supply voltage and current information.
voltages	(Optional) Displays system voltage information.
current	(Optional) Displays current sensor information.
temperatures	(Optional) Displays system temperature information.
trace	(Optional) Displays trace data for environment monitoring.
location <i>location</i>	(Optional) Enter the location for which the environmental information needs to be displayed.

Command Default

All environmental monitor parameters are displayed.

Command Modes

Administration EXEC

Command History

Release	Modification
Release 7.0.1	This command was introduced.

Usage Guidelines

The **show environment** command displays information about the hardware that is installed in the system, including fans, power supply voltage, current information, and temperatures.

Example

The following example shows sample output from the **show environment** command with the **fan** keyword.

```
sysadmin-vm:0_RP0# show environment fan
```

```
Wed Mar 20 04:40:02.510 UTC+00:00
=====
                        Fan speed (rpm)
Location      FRU Type      FAN_0    FAN_1
-----
0/FT0         NCS1K4-FAN           7020     6960
0/FT1         NCS1K4-FAN           6750     6720
0/FT2         NCS1K4-FAN           6750     6720

0/PM0         NCS1K4-AC-PSU       24800    23680
0/PM1         NCS1K4-AC-PSU       14240    14176
```

The following example shows sample output from the **show environment** command with the **temperatures** keyword.

sysadmin-vm:0_RP0# show environment temperatures location 0/RP0

```

Wed Mar 20 04:40:48.518 UTC+00:00
=====
Location  TEMPERATURE          Value   Crit Major Minor Minor Major  Crit
          Sensor                (deg C)  (Lo)  (Lo)  (Lo)  (Hi)  (Hi)  (Hi)
-----
0/RP0
          TEMP_LOCAL             29     -10    -5     0    55    65    70
          TEMP_REMOTE1           30     -10    -5     0    55    65    70
          TEMP_CPU_DIE           30     -10    -5     0    75    80    90

```

The following example shows sample output from the **show environment** command with the **power** keyword.

sysadmin-vm:0_RP0# show environment power

```

Wed Mar 20 04:41:39.990 UTC+00:00
=====
CHASSIS LEVEL POWER INFO: 0
=====
Total output power capacity (N + 1)      : 2000W + 0W
Total output power required              : 1430W
Total power input                        : 1075W
Total power output                       : 1009W

Power Group 0:
=====
Power      Supply    -----Input-----  -----Output---  Status
Module     Type      Volts    Amps    Volts    Amps
=====
0/PM0      2kW-AC          0.0      0.0      0.0      0.0    FAILED or NO PWR

Total of Power Group 0:                0W/ 0.0A          0W/ 0.0A

Power Group 1:
=====
Power      Supply    -----Input-----  -----Output---  Status
Module     Type      Volts    Amps    Volts    Amps
=====
0/PM1      2kW-AC          228.8    4.7     12.1     83.4    OK

Total of Power Group 1:                1075W/ 4.7A        1009W/ 83.4A

=====
Location    Card Type          Power      Power      Status
              Allocated    Used
              Watts      Watts
=====
0/0          NCS1K4-1.2T-K9      260         -         ON
0/1          NCS1K4-1.2T-K9      260         -         ON
0/2          NCS1K4-1.2T-K9      260         -         ON
0/3          NCS1K4-1.2T-K9      260         -         ON
0/RP0        NCS1K4-CNTLR-K9      55          -         ON
0/FT0        NCS1K4-FAN           100         -         ON
0/FT1        NCS1K4-FAN           100         -         ON
0/FT2        NCS1K4-FAN           100         -         ON
0/SC0        NCS1004              35          -         ON

```

The following example shows sample output from the **show environment** command with the **voltages** keyword.

sysadmin-vm:0_RP0# show environment voltages location 0/RP0

show hw-module

Wed Mar 20 04:43:04.524 UTC+00:00

Location	VOLTAGE Sensor	Value (mV)	Crit (Lo)	Minor (Lo)	Minor (Hi)	Crit (Hi)

0/RP0	ADM1266_VH1_12V	11982	10800	11040	12960	13200
	ADM1266_VH3_3V3	3303	3036	3135	3465	3564
	ADM1266_VH4_2V5	2493	2300	2375	2625	2700
	ADM1266_VP1_1V8	1794	1656	1710	1890	1944
	ADM1266_VP2_1V2	1189	1104	1140	1260	1296
	ADM1266_3V3_STAND_BY	3303	3036	3135	3465	3564
	ADM1266_VP4_3V3_CPU	3301	3036	3135	3465	3564
	ADM1266_VP5_2V5_CPU	2490	2300	2375	2625	2700
	ADM1266_VP6_1V8_CPU	1796	1656	1710	1890	1944
	ADM1266_VP7_1V24_VCCREF	1233	1140	1178	1302	1339
	ADM1266_VP8_1V05_CPU	1047	966	997	1102	1134
	ADM1266_VP9_1V2_DDR_VDDQ	1200	1104	1140	1260	1296
	ADM1266_VP10_1V0_VCCRAM	1056	500	650	1300	1400
	ADM1266_VP11_VNN	876	400	550	1300	1400
	ADM1266_VP12_VCCP	1062	300	450	1300	1400
	ADM1266_VP13_0V6_VTT	600	552	570	630	648
	ADM1293_DB_5V0	5014	4600	4750	5250	5400
	ADM1293_DB_3V3	3317	3036	3135	3465	3564
	ADM1293_DB_5V0_USB_0	5018	4000	4500	5500	6000
	ADM1293_DB_5V0_USB_1	5036	4000	4500	5500	6000
	ADM1293_MB_5V0_PMOD0	4932	4600	4750	5250	5400
	ADM1293_MB_5V0_PMOD1	5012	4600	4750	5250	5400
	ADM1293_MB_2V5_PL1	2485	2300	2375	2625	2700

show hw-module

To display the details of the muxponder slice, Field Programmable Devices (FPDs), and the card configuration in regen mode, use the **show hw-module** in XR EXEC or administration EXEC mode.

```
show hw-module { fpd | location location [ mxponder | mxponder-slice | regen |
xponder capabilities ] }
slicenumber
```

Syntax Description	
fpd	Displays the status of FPDs installed.
location location	Specifies the location.
mxponder	Displays information for all the slices of the muxponder.
mxponder-slice slicenumber	Displays information for a specific slice of the muxponder. The valid values of <i>slicenumber</i> are 0 and 1.
regen	Displays information of card configuration in regen mode.
xponder capabilities	Displays the client ports that are mapped to each trunk port along with the corresponding trunk rates and client rates.
Command Default	None

Command Modes

XR EXEC

Administration EXEC

Command History

Release	Modification
Release 7.0.1	This command was introduced.
Release 7.1.1	regen keyword was added.
Release 7.3.2	xponder capabilities keyword was added.

Usage Guidelines

If the ISO image has new version of FPD, the Status column in **show hw-module fpd** command shows NEED UPGD. If the upgrade is required, use the **upgrade hw-module location all fpd fpd_device_name** command to start the upgrade. When the upgrade starts, the Status column in **show hw-module fpd** command sequentially shows UPGD PREP, UPGRADING, and the percentage of upgrade completion. After the upgrade is completed, the Status column shows RLOAD REQ if the ISO image requires reload; otherwise the Status column shows CURRENT.

**Note**

The upgrade of LC_OPT_MOD_FW FPD affects traffic. Hence, the user must perform this upgrade during a maintenance window.

If reload is required:

Reload the line card or use the **admin hw-module location all reload** command to reboot NCS 1004. After the reload is completed, the new FPGA runs the current version.

Example

```
RP/0/RP0/CPU0:ios#show hw-module location 0/2 mxponder
Fri Mar 15 11:48:48.344 IST
```

```
Location:                0/2
Client Bitrate:          100GE
Trunk Bitrate:           500G
Status:                  Provisioned
LLDP Drop Enabled:       FALSE
Client Port              Mapper/Trunk Port      CoherentDSP0/2/0/0
CoherentDSP0/2/0/1
                        Traffic Split Percentage

HundredGigECtrlr0/2/0/2  ODU40/2/0/0/1      100
0
HundredGigECtrlr0/2/0/3  ODU40/2/0/0/2      100
0
HundredGigECtrlr0/2/0/4  ODU40/2/0/0/3      100
0
HundredGigECtrlr0/2/0/5  ODU40/2/0/0/4      100
0
HundredGigECtrlr0/2/0/6  ODU40/2/0/0/5      100
0
HundredGigECtrlr0/2/0/7  ODU40/2/0/1/1      0
100
```

show hw-module

```

HundredGigECtrlr0/2/0/8      ODU40/2/0/1/2      0
100
HundredGigECtrlr0/2/0/9      ODU40/2/0/1/3      0
100
HundredGigECtrlr0/2/0/10     ODU40/2/0/1/4      0
100
HundredGigECtrlr0/2/0/11     ODU40/2/0/1/5      0
100

```

The following is a sample output of all the muxponder slice 0 configurations.

```

RP/0/RP0/CPU0:ios#show hw-module location 0/1 mxponder-slice 0
Fri Mar 15 06:04:18.348 UTC

Location:          0/1
Slice ID:          0
Client Bitrate:    100GE
Trunk Bitrate:     500G
Status:            Provisioned
LLDP Drop Enabled: FALSE
Client Port                               Mapper/Trunk Port      CoherentDSP0/1/0/0
                                      Traffic Split Percentage

HundredGigECtrlr0/1/0/2      ODU40/1/0/0/1      100
HundredGigECtrlr0/1/0/3      ODU40/1/0/0/2      100
HundredGigECtrlr0/1/0/4      ODU40/1/0/0/3      100
HundredGigECtrlr0/1/0/5      ODU40/1/0/0/4      100
HundredGigECtrlr0/1/0/6      ODU40/1/0/0/5      100

```

The following is a sample output of all the muxponder slice 1 configurations.

```

RP/0/RP0/CPU0:ios#show hw-module location 0/1 mxponder-slice 1
Fri Mar 15 06:11:50.020 UTC

Location:          0/1
Slice ID:          1
Client Bitrate:    100GE
Trunk Bitrate:     400G
Status:            Provisioned
LLDP Drop Enabled: TRUE
Client Port                               Mapper/Trunk Port      CoherentDSP0/1/0/1
                                      Traffic Split Percentage

HundredGigECtrlr0/1/0/8      ODU40/1/0/1/1      100
HundredGigECtrlr0/1/0/9      ODU40/1/0/1/2      100
HundredGigECtrlr0/1/0/10     ODU40/1/0/1/3      100
HundredGigECtrlr0/1/0/11     ODU40/1/0/1/4      100

```

The following is a sample output of card configuration in regen mode.

```

RP/0/RP0/CPU0:ios#show hw-module location 0/0 regen
Mon Mar 25 09:50:42.936 UTC

Location:          0/0
Trunk Bitrate:     400G
Status:            Provisioned
East Port          West Port
CoherentDSP0/0/0/0 CoherentDSP0/0/0/1

```

The following shows the muxponder slice 0 configurations where the client ports that are mapped to each trunk port are displayed along with the corresponding trunk rates and client rates.

```
RP/0/RP0/CPU0:ios#show hw-module location 0/1 xponder-capabilities mxponder-slice 0
Fri Aug 13 18:21:43.931 UTC
```

```
Location: 0/1
```

```
Trunk-Port(s): 11
```

```
Port Group Restrictions:
Shared-Client-Group-Bandwidth Shared-Group-Client-Ports
400G 1, 6, 7, 10
```

```
Trunk-bandwidth: 400G
Client-port Supported client rates
1 100GE
6 100GE
7 100GE
10 100GE
```

```
Trunk-bandwidth: 300G
Client-port Supported client rates
1 100GE
7 100GE
10 100GE
```

```
Trunk-bandwidth: 200G
Client-port Supported client rates
7 100GE
10 100GE
```

show inventory

To retrieve and display the physical inventory information, use the **show inventory** command in XR EXEC or administration EXEC mode.

XR EXEC Mode

```
show inventory [all | oid | raw | location location ]
```

Administration EXEC Mode

```
show inventory [all | chassis | fan | power | raw | location location ]
```

Syntax	Description
all	(Optional) Displays inventory information for all the physical entities.
fan	(Optional) Displays inventory information for the fans.
power	(Optional) Displays inventory information for the power supply.
raw	(Optional) Displays raw information about the chassis for diagnostic purposes.
chassis	(Optional) Displays inventory information for the entire chassis.
location <i>location</i>	(Optional) Displays inventory information for a specific node, or for all nodes in the chassis.
oid	(Optional) Displays inventory information along with oid.

Command Default All hardware inventory information is displayed.

Command Modes XR EXEC
Administration EXEC

Command History	Release	Modification
	Release 7.0.1	This command was introduced.

Usage Guidelines Enter the **show inventory** command with the **raw** keyword to display every RFC 2737 entity installed in NCS 1004, including those without a PID, unique device identifier (UDI), or other physical identification. The **raw** keyword is primarily intended for troubleshooting problems with the **show inventory** command itself.

Example

The following examples show sample output from the **show inventory** command in both EXEC and Administration EXEC modes.

sysadmin-vm:0_RP0# **show inventory**

Thu Mar 7 12:49:15.974 UTC+00:00

Name: Rack 0 PID: NCS1004	Descr: Network Convergence System 1004 Chassis VID: V00 SN: CAT2217B020
Name: 0/0-Optics0/0/0/2 PID: QSFP-100G-LR4-S	Descr: Cisco QSFP-100G-LR4-S Pluggable Optics Module VID: V01 SN: FNS20530F3H
Name: 0/0-Optics0/0/0/3 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ22108035
Name: 0/0-Optics0/0/0/4 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ22108033
Name: 0/0-Optics0/0/0/5 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150QF8
Name: 0/0-Optics0/0/0/6 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150UJQ
Name: 0/0-Optics0/0/0/7 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150Q9P
Name: 0/0-Optics0/0/0/8 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150TE5
Name: 0/0-Optics0/0/0/9 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150TCP
Name: 0/0-Optics0/0/0/10 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150LDS
Name: 0/0-Optics0/0/0/11 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150L5H
Name: 0/0-Optics0/0/0/12 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150SED

Name: 0/0-Optics0/0/0/13 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150TUV
Name: 0/0 PID: NCS1K4-1.2T-K9	Descr: NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card VID: V00 SN: CAT2250B0A9
Name: 0/1-Optics0/1/0/2 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ22108003
Name: 0/1-Optics0/1/0/3 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150QD8
Name: 0/1-Optics0/1/0/4 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ22108004
Name: 0/1-Optics0/1/0/5 PID: QSFP-100G-SM-SR	Descr: Cisco 100G QSFP28 SM-SR Pluggable Optics Module VID: V02 SN: FNS22070GFW
Name: 0/1-Optics0/1/0/6 PID: QSFP-100G-SM-SR	Descr: Cisco 100G QSFP28 SM-SR Pluggable Optics Module VID: V01 SN: FNS20510ZFP
Name: 0/1-Optics0/1/0/7 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150QFJ
Name: 0/1-Optics0/1/0/8 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150TZF
Name: 0/1-Optics0/1/0/9 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150UJS
Name: 0/1-Optics0/1/0/10 PID: QSFP-100G-SM-SR	Descr: Cisco 100G QSFP28 SM-SR Pluggable Optics Module VID: V02 SN: FNS22070GCH
Name: 0/1-Optics0/1/0/11 PID: QSFP-100G-SM-SR	Descr: Cisco 100G QSFP28 SM-SR Pluggable Optics Module VID: V02 SN: FNS22070J79
Name: 0/1-Optics0/1/0/12 PID: QSFP-100G-SM-SR	Descr: Cisco 100G QSFP28 SM-SR Pluggable Optics Module VID: V02 SN: FNS22070GD7
Name: 0/1-Optics0/1/0/13 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150LHE
Name: 0/1 PID: NCS1K4-1.2T-K9	Descr: NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card VID: V00 SN: CAT2223B129
Name: 0/2-Optics0/2/0/2 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ22108001
Name: 0/2-Optics0/2/0/3 PID: LQ210CR-CPA1	Descr: Non-Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: 01 SN: FG4657250006
Name: 0/2-Optics0/2/0/4 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210802P
Name: 0/2-Optics0/2/0/5 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210802Q
Name: 0/2-Optics0/2/0/6 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210802R
Name: 0/2-Optics0/2/0/7 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210802U

show inventory

Name: 0/2-Optics0/2/0/8 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2146802T
Name: 0/2-Optics0/2/0/9 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210800G
Name: 0/2-Optics0/2/0/10 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210802M
Name: 0/2-Optics0/2/0/11 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: JFQ2210800P
Name: 0/2 PID: NCS1K4-1.2T-L-K9	Descr: NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card - Licensed VID: V00 SN: CAT2250B09F
Name: 0/3-Optics0/3/0/2 PID: ONS-QSFP28-LR4	Descr: Non-Cisco 100G QSFP28 LR4 Pluggable Optics Module VID: V01 SN: FNS20500RVT
Name: 0/3-Optics0/3/0/3 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S1D4
Name: 0/3-Optics0/3/0/4 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S16R
Name: 0/3-Optics0/3/0/5 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S16W
Name: 0/3-Optics0/3/0/6 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S17H
Name: 0/3-Optics0/3/0/7 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S1BA
Name: 0/3-Optics0/3/0/8 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S16G
Name: 0/3-Optics0/3/0/9 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S17N
Name: 0/3-Optics0/3/0/10 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S15W
Name: 0/3-Optics0/3/0/11 PID: QSFP-100G-CWDM4-S	Descr: Cisco 100G QSFP28 CWDM4 Pluggable Optics Module VID: V02 SN: FNS22150TES
Name: 0/3-Optics0/3/0/12 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S16S
Name: 0/3-Optics0/3/0/13 PID: QSFP-100G-SR4-S	Descr: Cisco 100GE QSFP28 SR4 Pluggable Optics Module VID: V03 SN: AVF2219S178
Name: 0/3 PID: NCS1K4-1.2T-K9	Descr: NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card VID: V00 SN: CAT2236B01A
Name: 0/RP0 PID: NCS1K4-CNTLR-K9	Descr: Network Convergence System 1004 Controller VID: V00 SN: CAT2217B09N
Name: 0/FT0 PID: NCS1K4-FAN	Descr: Network Convergence System 1004 Fan VID: V00 SN: CAT2218B12J
Name: 0/FT1 PID: NCS1K4-FAN	Descr: Network Convergence System 1004 Fan VID: V00 SN: CAT2218B125
Name: 0/FT2	Descr: Network Convergence System 1004 Fan

```

PID: NCS1K4-FAN          VID: V00          SN: CAT2218B124

Name: 0/PM0              Descr: Network Convergence System 1004 AC Power Supply Unit
PID: NCS1K4-AC-PSU       VID: V00          SN: POG2212CL12

Name: 0/PM1              Descr: Network Convergence System 1004 AC Power Supply Unit
PID: NCS1K4-AC-PSU       VID: V00          SN: POG2212CL2Q

Name: 0/SC0              Descr: Network Convergence System 1004 Chassis
PID: NCS1004             VID: V00          SN: CAT2217B020

```

RP/0/RP0/CPU0:ios# show inventory

```

Thu Mar  7 10:39:50.321 UTC
NAME: "0/0", DESCR: "NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card"
PID: NCS1K4-1.2T-K9      , VID: V00, SN: CAT2250B0A9

NAME: "0/0-Optics0/0/0/2", DESCR: "Cisco QSFP-100G-LR4-S Pluggable Optics Module"
PID: QSFP-100G-LR4-S     , VID: V01 , SN: FNS20530F3H

NAME: "0/0-Optics0/0/0/3", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: JFQ22108035

NAME: "0/0-Optics0/0/0/4", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: JFQ22108033

NAME: "0/0-Optics0/0/0/5", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150QF8

NAME: "0/0-Optics0/0/0/6", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150UJQ

NAME: "0/0-Optics0/0/0/7", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150Q9P

NAME: "0/0-Optics0/0/0/8", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150TE5

NAME: "0/0-Optics0/0/0/9", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150TCP

NAME: "0/0-Optics0/0/0/10", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150LDS

NAME: "0/0-Optics0/0/0/11", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150L5H

NAME: "0/0-Optics0/0/0/12", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150SED

NAME: "0/0-Optics0/0/0/13", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150TUV

NAME: "0/1", DESCR: "NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card"
PID: NCS1K4-1.2T-K9      , VID: V00, SN: CAT2223B129

NAME: "0/1-Optics0/1/0/2", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: JFQ22108003

NAME: "0/1-Optics0/1/0/3", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: FNS22150QD8

NAME: "0/1-Optics0/1/0/4", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S   , VID: V02 , SN: JFQ22108004

```

show inventory

```
NAME: "0/1-Optics0/1/0/5", DESCR: "Cisco 100G QSFP28 SM-SR Pluggable Optics Module"
PID: QSFP-100G-SM-SR , VID: V02 , SN: FNS22070GFW

NAME: "0/1-Optics0/1/0/6", DESCR: "Cisco 100G QSFP28 SM-SR Pluggable Optics Module"
PID: QSFP-100G-SM-SR , VID: V01 , SN: FNS20510ZFP

NAME: "0/1-Optics0/1/0/7", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: FNS22150QFJ

NAME: "0/1-Optics0/1/0/8", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: FNS22150TZF

NAME: "0/1-Optics0/1/0/9", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: FNS22150UJS

NAME: "0/1-Optics0/1/0/10", DESCR: "Cisco 100G QSFP28 SM-SR Pluggable Optics Module"
PID: QSFP-100G-SM-SR , VID: V02 , SN: FNS22070GCH

NAME: "0/1-Optics0/1/0/11", DESCR: "Cisco 100G QSFP28 SM-SR Pluggable Optics Module"
PID: QSFP-100G-SM-SR , VID: V02 , SN: FNS22070J79

NAME: "0/1-Optics0/1/0/12", DESCR: "Cisco 100G QSFP28 SM-SR Pluggable Optics Module"
PID: QSFP-100G-SM-SR , VID: V02 , SN: FNS22070GD7

NAME: "0/1-Optics0/1/0/13", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: FNS22150LHE

NAME: "0/2", DESCR: "NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card - Licensed"
PID: NCS1K4-1.2T-L-K9 , VID: V00, SN: CAT2250B09F

NAME: "0/2-Optics0/2/0/2", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ22108001

NAME: "0/2-Optics0/2/0/3", DESCR: "Non-Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: LQ210CR-CPA1 , VID: 01 , SN: FG4657250006

NAME: "0/2-Optics0/2/0/4", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210802P

NAME: "0/2-Optics0/2/0/5", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210802Q

NAME: "0/2-Optics0/2/0/6", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210802R

NAME: "0/2-Optics0/2/0/7", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210802U

NAME: "0/2-Optics0/2/0/8", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2146802T

NAME: "0/2-Optics0/2/0/9", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210800G

NAME: "0/2-Optics0/2/0/10", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210802M

NAME: "0/2-Optics0/2/0/11", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: JFQ2210800P

NAME: "0/3", DESCR: "NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card"
PID: NCS1K4-1.2T-K9 , VID: V00, SN: CAT2236B01A
```

NAME: "0/3-Optics0/3/0/2", DESCR: "Non-Cisco 100G QSFP28 LR4 Pluggable Optics Module"
PID: ONS-QSFP28-LR4 , VID: V01 , SN: FNS20500RVT

NAME: "0/3-Optics0/3/0/3", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S1D4

NAME: "0/3-Optics0/3/0/4", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S16R

NAME: "0/3-Optics0/3/0/5", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S16W

NAME: "0/3-Optics0/3/0/6", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S17H

NAME: "0/3-Optics0/3/0/7", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S1BA

NAME: "0/3-Optics0/3/0/8", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S16G

NAME: "0/3-Optics0/3/0/9", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S17N

NAME: "0/3-Optics0/3/0/10", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S15W

NAME: "0/3-Optics0/3/0/11", DESCR: "Cisco 100G QSFP28 CWDM4 Pluggable Optics Module"
PID: QSFP-100G-CWDM4-S , VID: V02 , SN: FNS22150TES

NAME: "0/3-Optics0/3/0/12", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S16S

NAME: "0/3-Optics0/3/0/13", DESCR: "Cisco 100GE QSFP28 SR4 Pluggable Optics Module"
PID: QSFP-100G-SR4-S , VID: V03 , SN: AVF2219S178

NAME: "0/RP0", DESCR: "Network Convergence System 1004 Controller"
PID: NCS1K4-CNTRLR-K9 , VID: V00, SN: CAT2217B09N

NAME: "0/SC0", DESCR: "Network Convergence System 1004 Chassis"
PID: NCS1004 , VID: V00, SN: CAT2217B020

NAME: "Rack 0", DESCR: "Network Convergence System 1004 Chassis"
PID: NCS1004 , VID: V00, SN: CAT2217B020

NAME: "0/FT0", DESCR: "Network Convergence System 1004 Fan"
PID: NCS1K4-FAN , VID: V00, SN: CAT2218B12J

NAME: "0/FT1", DESCR: "Network Convergence System 1004 Fan"
PID: NCS1K4-FAN , VID: V00, SN: CAT2218B125

NAME: "0/FT2", DESCR: "Network Convergence System 1004 Fan"
PID: NCS1K4-FAN , VID: V00, SN: CAT2218B124

NAME: "0/PM0", DESCR: "Network Convergence System 1004 AC Power Supply Unit"
PID: NCS1K4-AC-PSU , VID: V00, SN: POG2212CL12

NAME: "0/PM1", DESCR: "Network Convergence System 1004 AC Power Supply Unit"
PID: NCS1K4-AC-PSU , VID: V00, SN: POG2212CL2Q

show led

To display the status of various LEDs present in NCS 1004, use the **show led** command in administration EXEC mode.

show led [**location** *location*]

Syntax Description	location <i>location</i> (Optional) Displays LED information for a specific location.
---------------------------	--

Command Default	The status of all the LEDs present in NCS 1004 is displayed.
------------------------	--

Command Modes	Administration EXEC
----------------------	---------------------

Command History	<table border="1"> <tr> <th>Release</th> <th>Modification</th> </tr> <tr> <td>Release 7.0.1</td> <td>This command was introduced.</td> </tr> </table>	Release	Modification	Release 7.0.1	This command was introduced.
Release	Modification				
Release 7.0.1	This command was introduced.				

Usage Guidelines	Enter the show LED command in administration EXEC mode to display the status of all the LEDs present in NCS 1004.
-------------------------	--

Example

The following example shows sample output from the **show led** command.

sysadmin-vm:0_RP0# **show led**

```

Wed Mar 20 04:45:25.457 UTC+00:00
=====
Location  LED Name                               Mode      Color
=====
0/0
0/0-Status LED                               WORKING   GREEN
0/1
0/1-Status LED                               WORKING   GREEN
0/2
0/2-Status LED                               WORKING   GREEN
0/3
0/3-Status LED                               WORKING   GREEN
0/RP0
0/RP0-Attention LED                           WORKING   OFF
0/RP0-SYS LED                                WORKING   AMBER
0/RP0-PSU LED                                WORKING   RED
0/RP0-FAN LED                                WORKING   GREEN
0/FT0
0/FT0-Status LED                             WORKING   GREEN
0/FT1
0/FT1-Status LED                             WORKING   GREEN
0/FT2
0/FT2-Status LED                             WORKING   GREEN
0/PM0
0/PM0-Status LED                             WORKING   AMBER
0/PM1
0/PM1-Status LED                             WORKING   GREEN

```

show platform

To display information and status for each node in the system, use the **show platform** command in XR EXEC or administration EXEC mode.

Administration EXEC Mode

show platform [{**detail** | **location** | **slices**} *location*]

XR EXEC Mode

show platform [**vm** | **0/RP0**]

Syntax Description

detail	(Optional) Displays the details of node type and state.
location	(Optional) Displays the location of node.
slices	(Optional) Displays the summary information of each slice in the node.
<i>location</i>	(Optional) Node location such as 0/FT0, 0/RP0.
vm	(Optional) Displays the virtual machine information of node.

Command Default

The status and information are displayed for all the nodes in the system.

Command Modes

XR EXEC

Administration EXEC

Command History

Release	Modification
Release 7.0.1	This command was introduced.

Usage Guidelines

Enter the **show platform** command in administration EXEC mode to display the output for the entire system.

Example

The following example shows sample output from the **show platform** command.

sysadmin-vm:0_RP0# **show platform**

```

Wed Mar 20 04:27:21.562 UTC+00:00
Location  Card Type                HW State      SW State      Config State
-----
0/0       NCS1K4-1.2T-K9            OPERATIONAL   N/A           NSHUT
0/1       NCS1K4-1.2T-K9            OPERATIONAL   N/A           NSHUT
0/2       NCS1K4-1.2T-K9            OPERATIONAL   N/A           NSHUT
0/3       NCS1K4-1.2T-K9            OPERATIONAL   N/A           NSHUT
0/RP0     NCS1K4-CNTRLR-K9          OPERATIONAL   OPERATIONAL   NSHUT
0/FT0     NCS1K4-FAN                 OPERATIONAL   N/A           NSHUT
0/FT1     NCS1K4-FAN                 OPERATIONAL   N/A           NSHUT
0/FT2     NCS1K4-FAN                 OPERATIONAL   N/A           NSHUT

```

show platform

```

0/PM0      NCS1K4-AC-PSU      OPERATIONAL  N/A      NSHUT
0/PM1      NCS1K4-AC-PSU      OPERATIONAL  N/A      NSHUT
0/SC0      NCS1004            OPERATIONAL  N/A      NSHUT

```

The following example shows sample output from the **show platform detail** command.

sysadmin-vm:0_RP0# **show platform detail**

```

Wed Mar 20 04:31:02.480 UTC+00:00
MODULE

```

```

          HW OPER      SW OPER
LOCATION :  PID :      DESCRIPTION :
      VID/SN : STATE :      STATE :      CONFIGURATION : HW VERSION : LAST EVENT :
LAST EVENT REASON :

```

```

0/0      NCS1K4-1.2T-K9      NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW READY
0/1      NCS1K4-1.2T-K9      NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW READY
0/2      NCS1K4-1.2T-K9      NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW READY
0/3      NCS1K4-1.2T-K9      NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW READY
0/RP0    NCS1K4-CNTLR-K9      Network Convergence System 1004 Controller
      V00      OPERATIONAL  OPERATIONAL  NSHUT RST      0.1      HW_EVENT_OK
HW Event OK
0/FT0    NCS1K4-FAN          Network Convergence System 1004 Fan
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW Operational
0/FT1    NCS1K4-FAN          Network Convergence System 1004 Fan
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW Operational
0/FT2    NCS1K4-FAN          Network Convergence System 1004 Fan
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW Operational
0/PM0    NCS1K4-AC-PSU      Network Convergence System 1004 AC Power Supply Unit
      V00      OPERATIONAL  N/A      NSHUT RST      0.0      HW_EVENT_OK
HW Operational
0/PM1    NCS1K4-AC-PSU      Network Convergence System 1004 AC Power Supply Unit
      V00      OPERATIONAL  N/A      NSHUT RST      0.0      HW_EVENT_OK
HW Operational
0/SC0    NCS1004            Network Convergence System 1004 Chassis
      V00      OPERATIONAL  N/A      NSHUT RST      0.1      HW_EVENT_OK
HW Event OK

```

RP/0/RP0/CPU0:ios# **show platform**

```

Wed Mar 20 04:23:12.582 UTC

```

Node	Type	State	Config state
0/0	NCS1K4-1.2T-K9	OPERATIONAL	NSHUT
0/1	NCS1K4-1.2T-K9	OPERATIONAL	NSHUT
0/2	NCS1K4-1.2T-K9	OPERATIONAL	NSHUT
0/3	NCS1K4-1.2T-K9	OPERATIONAL	NSHUT
0/RP0/CPU0	NCS1K4-CNTLR-K9 (Active)	IOS XR RUN	NSHUT
0/FT0	NCS1K4-FAN	OPERATIONAL	NSHUT
0/FT1	NCS1K4-FAN	OPERATIONAL	NSHUT
0/FT2	NCS1K4-FAN	OPERATIONAL	NSHUT
0/PM0	NCS1K4-AC-PSU	OPERATIONAL	NSHUT

0/PM1
0/SC0

NCS1K4-AC-PSU
NCS1004

OPERATIONAL
OPERATIONAL

NSHUT
NSHUT

signalling refresh out-of-band interval

To specify the out-of-band refresh interval for RSVP, use the **signalling refresh out-of-band interval** command in RSVP controller configuration mode.

signalling refresh out-of-band interval *interval*

Syntax Description	<i>interval</i> Specifies the refresh interval (180-86400 seconds).				
Command Default	45 seconds				
Command Modes	RSVP controller configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>Release 7.0.1</td><td>This command is introduced.</td></tr> </table>	Release	Modification	Release 7.0.1	This command is introduced.
Release	Modification				
Release 7.0.1	This command is introduced.				
Usage Guidelines	This command applies only to the RSVP sessions associated with GMPLS UNI tunnels.				

Example

The following example shows how to specify 200 seconds for the out-of-band interface refresh interval.

```
RP/0/RP0/CPU0:ios(config)#rsvp
RP/0/RP0/CPU0:ios(config-rsvp)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-rsvp-ctrl)#signalling refresh out-of-band interval 200
RP/0/RP0/CPU0:ios(config-rsvp-ctrl)#
```

signalling refresh out-of-band missed

To specify the number of missed refresh messages allowed before states are deleted for optical tunnels, use the **signalling refresh out-of-band missed** command in RSVP controller configuration mode.

signalling refresh out-of-band missed *mis-count*

Syntax Description	<i>mis-count</i> Number of missed refresh messages allowed before states are deleted for optical tunnels (1-48).
Command Default	The default value is 12.
Command Modes	RSVP controller configuration

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Usage Guidelines This command applies only to the RSVP sessions associated with GMPLS UNI tunnels.

Example

The following example shows how to specify a maximum of 10 messages for the number of allowed missed refresh messages.

```
RP/0/RP0/CPU0:ios(config)#rsvp
RP/0/RP0/CPU0:ios(config-rsvp)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-rsvp-ctrl)#signalling refresh out-of-band missed 10
RP/0/RP0/CPU0:ios(config-rsvp-ctrl)#
```

tunnel-id

To specify the ID of the GMPLS UNI tunnel, use the **tunnel-id** command in GMPLS UNI controller tunnel-properties configuration sub-mode.

tunnel-id *number*

Syntax Description	<i>number</i> Specifies the tunnel ID.
--------------------	--

Command Default None

Command Modes GMPLS UNI controller tunnel-properties configuration

Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following example shows how to specify a tunnel ID.

```
RP/0/RP0/CPU0:ios(config)#mpls traffic-eng
RP/0/RP0/CPU0:ios(config-mpls-te)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-te-gmpls)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-te-gmpls-ctrl)#tunnel-properties
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#tunnel-id 5
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#
```

tunnel-properties

To configure tunnel-specific information for a GMPLS UNI controller, use the **tunnel-properties** command in GMPLS-UNI configuration sub-mode.

tunnel-properties

Syntax Description	This command has no keywords or arguments.	
Command Default	None	
Command Modes	GMPLS UNI configuration	
Command History	Release	Modification
	Release 7.0.1	This command is introduced.

Example

The following example shows how to enter the sub-mode to configure tunnel-specific information for a GMPLS UNI controller.

```
RP/0/RP0/CPU0:ios(config)#mpls traffic-eng
RP/0/RP0/CPU0:ios(config-mpls-te)#gmpls optical-uni
RP/0/RP0/CPU0:ios(config-te-gmpls)#controller Optics0/0/0/0
RP/0/RP0/CPU0:ios(config-te-gmpls-ctl)#tunnel-properties
RP/0/RP0/CPU0:ios(config-te-gmpls-tun)#
```

