Cable Commands: q through sg

qos-profile enforced

To specify a quality-of-service (QoS) profile that should be enforced when users violate their registered QoS profiles, use the **qos-profile enforced** command in enforce-rule configuration mode. To delete the enforced QoS profile from the enforce-rule, use the **no** form of this command.

qos-profile enforced *profile-id* [**no-persistence**]
no qos-profile enforced *profile-id* [**no-persistence**]

Syntax Description

profile-id	Specifies the QoS profile to be enforced. The valid range is 0 to 16383, with a default of 0.
no-persistence	(Optional) Specifies that the enforced QoS profile should not remain in force when a cable modem reboots. Instead, when a cable modem that is in the penalty period reboots, it is automatically removed from the penalty period and assigned the QoS profile that is specified in its DOCSIS configuration file. The default behavior is that enforced QoS profiles remain in force for cable modems across reboots.

Command Default

The value of *profile-id* defaults to 0, and enforced QoS profiles are persistent across cable modem reboots.

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(9a)BC	This command was introduced. This command replaces the **enforced qos-profile** command.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Both the originally provisioned QoS profile and the enforced QoS profile must be created on the Cisco CMTS router. The *profile-id* does not support QoS profiles that are created by the cable modem.

An enforce-rule can specify an enforced QoS profile, which is automatically applied to subscribers who transmit more traffic than allowed by their registered QoS profile. The enforced QoS profile remains in effect during the penalty time period (see the **penalty-period** command). At the end of the penalty period, the subscriber returns to the registered QoS profile.

If a cable modem reboots while it is in its penalty time period, it continues using the enforced QoS profile, unless the service provider has manually changed the cable modem's registered QoS profile using the **cable modem qos profile** command.

When you change the enforced QoS profile for a currently active enforce-rule, any cable modems using this rule that are currently in the penalty period continue using the previously configured enforced QoS profile. Any cable modems that enter the penalty period after this configuration change, however, use the new enforced QoS profile.

An enforced QoS profile must already have been created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message.

When the **no-persistence** option is specified, the enforced QoS profile is still automatically applied to subscribers who violate their bandwidth requirements. However, when the cable modem reboots, the Cisco CMTS router allows the cable modem to use the QoS profile that is specified in its DOCSIS configuration file.

The **no-persistence** option can be used when initially using the Subscriber Traffic Management feature to identify potential problem applications and users. When repeat offenders are identified, they can then be assigned enforce-rules that do not use the **no-persistence** option, so that they remain in the penalty period even if they reboot their cable modems.

Note The system automatically applies the enforced QoS profile to violators only if the **enforce** keyword has been used with the **activate-rule-at-byte-count** command.

Examples

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule:

```
Router# configure terminal

Router(config)# cable qos enforce-rule residential

Router(enforce-rule)# qos-profile enforced 12
```

The following example shows profile 12 being assigned as the enforced QoS profile to an enforce-rule, but with the **no-persistence** option specified, so that the enforced QoS profile does not remain in force if the cable modem reboots:

```
Router# configure terminal

Router(config)# cable qos enforce-rule residential

Router(enforce-rule)# qos-profile enforced 12 no-persistence
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal

Router(config)# cable qos enforce-rule test

Router(enforce-rule)# qos-profile enforced 98

The qos profile 98 doesn't exist or it's a cm created QoS profile
```

Related Commands

Command	Description
cable qos enforce-rule	Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.

Command	Description
debug cable subscriber-monitoring	Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.
duration	Specifies the time period and sample rate to be used for monitoring subscribers.
enabled (enforce-rule)	Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.
monitoring-basics	Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router.
peak-time1	Specifies peak and offpeak monitoring times on a Cisco CMTS router.
qos-profile registered	Specifies the registered QoS profile that should be used for this enforce-rule.
service-class (enforce-rule)	Identifies a particular service class for cable modem monitoring in an enforce-rule.
show cable qos enforce-rule	Displays the QoS enforce-rules that are currently defined.
show cable subscriber-usage	Displays subscribers who are violating their registered QoS profiles.

qos-profile registered

To specify the registered quality of service (QoS) profile that should be used for this enforce-rule, use the **qos-profile registered** command in enforce-rule configuration mode. To remove the registered QoS profile from the enforce-rule, use the **no** form of this command.

qos-profile registered *profile-id*
no qos-profile registered *profile-id*

Syntax Description

profile-id	Specifies the QoS profile to be monitored. This profile must be created on the Cisco CMTS router. If you want to manage a cable modem that uses a modem-created QoS profile, you must first create that exact QoS profile on the CMTS router before using this command. The valid range is 0 to 16383, with a default of 0.

Command Default

The default profile ID is 0.

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(9a)BC	This command was introduced. This command replaces the **registered qos-profile** command.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You must specify a registered QoS profile for each enforce-rule. The Cisco CMTS router then uses the registered profile ID to match subscribers' service flows to the proper enforce-rules.

When you change the registered QoS profile for an active rule, the cable modems that had been using the previous registered QoS profile are no longer managed by the Subscriber Traffic Management feature. Instead, the rule begins managing those cable modems that use the new registered QoS profile.

Note The registered QoS profile must be created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message. If you want to manage a cable modem that is currently using a modem-created QoS profile, you must first manually create a new QoS profile on the CMTS router that has the same QoS parameters as the modem-created profile. Then allow the modem to come online using the manually created profile, before using the **qos-profile registered** command.

Examples

The following example shows profile 50 being assigned as the registered QoS profile to an enforce-rule:

```
Router# configure terminal

Router(config)# cable qos enforce-rule enforce-rule
Router(enforce-rule)# qos-profile registered 50
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal

Router(config)# cable qos enforce-rule test

Router(enforce-rule)# qos-profile registered 99

The qos profile 99 doesn't exist or it's a cm created QoS profile
```

Related Commands

Command	Description
cable qos enforce-rule	Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.
debug cable subscriber-monitoring	Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.
duration	Specifies the time period and sample rate to be used for monitoring subscribers.
enabled (enforce-rule)	Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.
monitoring-basics	Specifies the type of monitoring for subscriber traffic management on a Cisco CMTS router.
peak-time1	Specifies peak and offpeak monitoring times on a Cisco CMTS router.
qos-profile enforced	Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.
service-class (enforce-rule)	Enables the enforcing of QOS profiles according to service class.
show cable qos enforce-rule	Displays the QoS enforce-rules that are currently defined.
show cable subscriber-usage	Displays subscribers who are violating their registered QoS profiles.

qam-profile

To define the QAM profile number, use the **qam-profile** command in the RF channel sub configuration mode.

qam-profile *value*

Syntax Description

value Value for the QAM profile. The QAM profiles are defined before they are associated with rf-channels. Valid range is 0 to 31.

- QAM profile ID 0 to 5
- System defined 6 to 31

Once defined, the rf-channel associated with that profile must match the correct qam-profile type. For instance, qam-profile 4 is defined for video, and may be used with rf-channels of type VIDEO.

Command Default

None.

Command Modes

RF channel sub configuration mode (config-rf-chan)

Usage Guidelines

This command is used to define the QAM profile number.

The following example shows how to define the QAM profile number:

```
router#configure terminal
router(config)#controller integrated-cable 3/0/0
router(config-controller)#rf-chan 5 10
router(config-rf-chan)#type video
router(config-rf-chan)#frequency 723000000
router(config-rf-chan)#rf-output alt
router(config-rf-chan)#power-adjust 0
router(config-rf-chan)#qam-profile 4
router(config-rf-chan)#exit
router(config-controller)#exit
router(config)#exit
router#show controller integrated-Cable 3/0/0 rf-channel 5 10
Chan State Admin Frequency  Type   Annex Mod  srate Interleaver  dcid  power  output
 5   TEST   UP   723000000  VIDEO  B    256   5361  I32-J4       164  34     ALT
 10  TEST   UP   753000000  VIDEO  B    256   5361  I32-J4       169  34     ALT
```

Related Commands

Command	Description
controller integrated-cable	Enters the controller configuration mode.
frequency	Defines the RF channel frequency.
qam-profile	Defines the QAM profile number.
rf-chan	Enters the RF channel sub configuration mode.
rf-output	Defines the QAM output mode.
power-adjust	Defines the channel power level.

r-dti

To specify the Remote DOCSIS Timing Interface (R-DTI) configuration ID to use in RPD, use the **r-dti** command in RPD configuration mode. To void the R-DTI configuration specification, use the **no** form of this command.

r-dti *configuration_id*

no r-dti

Syntax Description

configuration_id	Specifies the ID of the R-DTI configuration previously created.

Command Default

None

Command Modes

RPD configuration (config-rpd)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the R-DTI configuration ID.

The following example shows how to specify the R-DTI configuration ID:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# r-dti 1
```

rcp-id

To assign a receive channel profile (RCP) ID to a receive channel configuration (RCC) template, use the **rcp-id** command in RCC template configuration mode. To remove the RCP ID, use the **no** form of this command.

rcp-id *rcp-id*
no rcp-id *rcp-id*

Syntax Description

rcp-id	Specifies an RCP ID for the RCC template. The valid range is from 00 00 00 00 00 to FF FF FF FF FF.

Command Default

By default the RCP ID is set to 00 00 00 00 00. However, you must change the default value to a non-zero RCP ID.

Command Modes

RCC template configuration (config-rcc-template)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.

Usage Guidelines

A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry.

First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

Examples

The following example shows how to assign an RCP ID to an RCC template:

```
Router# configure terminal
Router(config)# cable rcc-template
 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
```

Related Commands

Command	Description
rcp-id	Specifies an ID for the receive channel profile.
receive-module	Specifies a receive module entry in the form of a numeric value.
receive-channel	Specifies a receive channel entry in the form of a numeric value.

receive-channel

To associate a receive channel to a receive module (RC), use the **receive-channel** command in RCC template configuration mode. To restore the default value, use the **no** form of this command.

receive-channel *index* **center-frequency** *Hz* **connected-receive-module** *index* [**primary**]
no receive-channel *index* **center-frequency** *Hz* **connected-receive-module** *index*

Syntax Description

index	Specifies the index value for the receive channel. The valid range is 1 to 10.
center-frequency	Specifies the center frequency for the receive channel.
Hz	Specifies the center frequency value in Hz. The valid range is 55000000-858000000.
connected-receive-module	Specifies a nested receive module in the RCC template. Generally, only one receive module is configured for an RCC template.
index	Specifies the index value for the connected receive module. The valid range is 1 to 10.
primary	(Optional) Indicates that it is a CM primary channel and an RCC can be derived from this channel.

Command Default

None

Command Modes

RCC template configuration (config-rcc-template)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry. First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

An RCC template configures the physical layer components described by an RCP, including receive modules and receive channels to specific downstream frequencies, and specifies the interconnections among receive modules or between receive modules and receive channels.

A receive module can include multiple receive channels. So we need to specify which receive channel belongs to which receive module.

Examples

The following example shows how to associate a receive channel to a receive module:

```
Router# configure terminal
```

```
Router(config)# cable rcc-template
 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
Router(config-rcc-template)# receive-module 1 first-channel-center-frequency 555000000
Router(config-rcc-template)# receive-channel 1 center-frequency 555000000
connected-receive-module 1 primary
Router(config-rcc-template)# receive-channel 2 center-frequency 561000000
connected-receive-module 1
```

Related Commands

Command	Description
cable rcc-template	Defines a receive channel configuration (RCC) template for an RCP.
rcp-id	Specifies an ID for the receive channel profile.
receive-module	Specifies a receive module entry in the form of a numeric value.

receive-module

To associate a receive module (RC) to a Receive Channel Configuration (RCC) template, use the **receive-module** command in RCC template configuration mode. To restore the default value, use the **no** form of this command.

receive-module *index* **first-channel-center-frequency** *Hz* [**connected-receive-module** *index*]
no receive-module *index* **first-channel-center-frequency** *Hz* [**connected-receive-module** *index*]

Syntax Description

index	Specifies the index value for the receive module. The valid index range is 1 to 10.
first-channel-center-frequency	Specifies the center frequency of the first channel of the receive module channel block.
Hz	Specifies the center frequency value in Hz. The valid range is 55000000 to 858000000.
connected-receive-module	(Optional) Specifies a nested receive module in the RCC template. Generally, only one receive module is configured for an RCC template.
index	(Optional) Specifies the index value for the connected receive module. The valid range is 1 to 10.

Command Default

None

Command Modes

RCC template configuration (config-rcc-template)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

A valid RCC template consists of a configured RCP ID, a receive module (RM) entry, and a receive channel (RC) entry. First, you define an RCC template for an RCP, and then assign the template to a cable interface to generate RCCs based on the actual DS channel configuration.

An RCC template configures the physical layer components described by an RCP, including receive modules and receive channels to specific downstream frequencies, and specifies the interconnections among receive modules or between receive modules and receive channels.

A receive module can include multiple receive channels. So we need to specify which receive channel belongs to which receive module.

Examples

The following example shows how to associate a receive module to an RCC template:

```
Router# configure terminal
```

```
Router(config)# cable rcc-template
 1
Router(config-rcc-template)# rcp-id 00 10 00 00 03
Router(config-rcc-template)# receive-module 1 first-channel-center-frequency 555000000
Router(config-rcc-template)# receive-channel 1 center-frequency 555000000
connected-receive-module 1 primary
Router(config-rcc-template)# receive-channel 2 center-frequency 561000000
connected-receive-module 1
```

Related Commands

Command	Description
cable rcc-template	Defines a receive channel configuration (RCC) template for an RCP.
rcp-id	Specifies an ID for the receive channel profile.
receive-channel	Specifies a receive channel entry in the form of a numeric value.

redundancy

To configure line card redundancy, use the **redundancy** command in global configuration mode.

redundancy

Syntax Description

This command has no arguments or keywords.

Command Default

None.

Command Modes

Global configuration (config)

Command History

Release	Modification
IOS-XE Release 3.16.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **redundancy** command to enter the redundancy configuration mode.

Examples

The following example shows how to configure line card redundancy:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# redundancy
Router(config-red)# linecard-group 0 internal-switch
Router(config-red-lc)# description RedundancyGroup0
Router(config-red-lc)# class 1:N
Router(config-red-lc)# revertive 60
Router(config-red-lc)# member slot 1 primary
Router(config-red-lc)# member slot 0 secondary
```

Related Commands

Command	Description
linecard-group internal-switch	Creates a line card group for the line card.
description	Adds a description to the line card group.
class	Configures redundancy class on the line card.

redundancy force-failover main-cpu

To force a switchover, so that the standby Performance Routing Engine (PRE1) module becomes the active PRE1 module, use the**redundancy force-failover main-cpu** command in privileged EXEC mode.

redundancy force-failover main-cpu

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(4)XF1	This command was introduced for the Cisco uBR10012 router.
12.2(11)BC3	The active PRE1 module checks to see if a switchover is currently in progress before implementing this command.
12.3(21)BC	This command is replaced by the **redundancy switch-activity** command.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **redundancy force-failover main-cpu** command initiates a manual switchover, so that the standby PRE1 module becomes the active PRE1 module and assumes full responsibilities for router operations. This command requires that both PRE1 modules are running a Cisco IOS software image that supports the Route Processor Redundancy (RPR) feature.

Note The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.

A manual switchover is typically done for one of the following reasons:

- You want to upgrade or replace the active PRE1 module.
- You have upgraded the Cisco IOS software on the standby PRE1 module and want the standby PRE1 module to begin using the new software image. This also allows you to upgrade the software on the former active PRE1 module without interrupting systems operations.
- You want to test switchover operation on the system.

A switchover can also be manually initiated by removing the active PRE1 module from the chassis, but using the **redundancy force-failover main-cpu** command provides a more graceful switchover, without generating hardware alarms.

Tip Do not perform a switchover immediately after you change the configuration and save it to the NVRAM. Instead, wait a few minutes to allow the two PRE1 modules to synchronize the new configuration, and then perform the switchover.

Tip Wait two to three minutes after a switchover before switching the system back to the original PRE1 module, so as to allow the system to stabilize and so that both PRE1 modules are ready for the switch. In Cisco IOS Release 12.2(11)BC3 and later releases, the active PRE1 module will not initiate a new switchover until a current switchover is complete and the system has stabilized.

Examples

The following example shows a switchover being manually initiated:

```
Router# redundancy force-failover main-cpu

Proceed with switchover to standby PRE? [confirm] y
```

Note Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key cancels the switchover and returns control to the current active PRE1 module.

The following example shows a switchover being attempted but failing because the standby PRE1 module is either not ready, not available, or not installed:

```
Router# redundancy force-failover main-cpu

Proceed with switchover to standby PRE? [confirm]
Standby PRE not ready, switchover aborted.
Router#
```

Note In some versions of Cisco IOS software, a failed software switchover will show the following message:

```
Unable to communicate with standby PRE, switchover aborted.
```

Related Commands

Command	Description
associate	Associates two line cards for Automatic Protection Switching (APS) redundancy protection.
redundancy	Enters redundancy configuration mode so that the synchronization parameters can be configured.
redundancy reload	Resets the standby PRE1 module, or to reset both the active and standby PRE1 modules.
redundancy switch-activity	Forces a switchover to the standby PRE module.

redundancy force-switchover main-cpu

To force a standby Performance Routing Engine (PRE) to assume the role of an active PRE, use the **redundancy force-switchovermain-cpu** command in privileged EXEC mode.

redundancy force-switchovermain-cpu

Syntax Description

None

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Before using this command, install the Cisco IOS software image (to ensure high availability), and configure the Route Processor Redundancy (RPR) mode on both the PRE modules.

Note The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.

Note We recommend you use the **redundancy force-switchover main-cpu** command only on the active PRE module. The active PRE crashes used on the standby PRE.

Examples

The following example shows a manual switchover:

```
Router# redundancy force-switchover main-cpu

Proceed with switchover to standby PRE? [confirm] y

Preparing to Switch Activity
```

Note Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key cancels the switchover and returns control to the currently active PRE module.

The following example shows a switchover being attempted but failing because the standby PRE module is either not ready, not available, or not installed:

```
Router# redundancy force-switchover main-cpu

Proceed with switchover to standby PRE? [confirm] n

Standby PRE not ready, switchover aborted.

Router#
```

Related Commands

Command	Description
redundancy	Enters the redundancy configuration mode so that the synchronization parameters could be configured.
redundancy reload	Resets the standby PRE module or resets both the active and standby PRE modules.
redundancy switch-activity	Forces a switchover to the standby PRE module.
show redundancy	Displays the current active and standby Supervisor card redundancy status.

redundancy linecard-group

To trigger a switchover from the working line card to the protect line card, or to revert from the protect line card to the working line card on the Cisco uBR10012 and Cisco cBR series routers, use the **redundancy linecard-group** command in privileged EXEC mode.

redundancy linecard-group {**lockout** | **resync** | **revertback** | **switchover from** | **unlockout**} **slot**/**subslot**
Cisco cBR Series Converged Broadband Routers
redundancy linecard-group switchover from *slot*

Syntax Description

lockout	Locks a line card switchover from the specified working slot and subslot.
resync	Specifies static synchronization from the working line card to the protect line card.
revertback	Reverts from the protect line card to the working line card.
switchover from	Triggers a switchover from the working line card to the protect line card.
slot	(Cisco cBR series routers) Slot number of the interface card. The range is from 0 to 3 and 6 to 9 on the Cisco cBR-8 router.
unlockout	Removes the switchover lockout from the specified working slot and subslot.
slot / *subslot*	(Cisco uBR10012 router) Specifies the cable interface line card. • *slot*—Chassis slot number of the cable interface line card. The valid range is from 5 to 8. • *subslot*—(Cisco uBR10012 router only) Secondary slot number of the cable interface line card. Valid subslots are 0 and 1.

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.3(13a)BC	This command was introduced.
12.2(33)SCE	This command was modified. A new keyword, **resync**, was added to enable the Cisco uBR10012 router to perform a manual synchronization from the working line card to the protect line card.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. The **lockout**, **resync**, **revertback**, and **unlockout** keywords were removed.

Usage Guidelines

The **redundancy linecard-group** command is supported only on the Cisco uBR10012 and Cisco cBR series routers.

When the normal (system initiated) static line card synchronization fails, use the **redundancy linecard-group** command with the **resync** keyword to enable the Cisco uBR10012 router to perform a manual synchronization from the working line card to the protect line card.

Examples

The following example shows how to lock a line card switchover from slot 5 and subslot 0 on the Cisco uBR10012 router using the **redundancy linecard-group** command with the **lockout** keyword:

```
Router# redundancy linecard-group lockout 5/0
HCCP LC: 5/0 Working will be locked out, this operation will prevent all kinds of switchover.
```

The following example shows how to remove the switchover lockout from slot 5 and subslot 0 on the Cisco uBR10012 router using the **redundancy linecard-group** command with the **unlockout** keyword:

```
Router# redundancy linecard-group unlockout 5/0
```

The following example shows how to enable the Cisco uBR10012 router to perform a manual synchronization from the working line card to the protect line card using the **redundancy linecard-group** command with the **resync** keyword:

```
Router# redundancy linecard-group resync 5/0
*Nov  9 23:09:09.049: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state to
administratively down
*Nov  9 23:09:09.049: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state to
administratively down
*Nov  9 23:09:09.049: %SNMP-5-LINK_DOWN: LinkDown:Interface Cable5/1/1-upstream2 changed
state to down
*Nov  9 23:09:09.049: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state to
administratively down
*Nov  9 23:09:09.057: %SNMP-5-LINK_DOWN: LinkDown:Interface Cable5/1/1-upstream1 changed
state to down
*Nov  9 23:09:09.057: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state to up
*Nov  9 23:09:09.057: %SNMP-5-LINK_DOWN: LinkDown:Interface Cable5/1/1-upstream0 changed
state to down
*Nov  9 23:09:09.061: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state to up
*Nov  9 23:09:09.061: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state to up
*Nov  9 23:09:09.173: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/1/1-upstream0 changed state
 to up
SLOT 5/1: Nov  9 23:09:09.057: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state
to administratively down
SLOT 5/1: Nov  9 23:09:09.057: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state
to administratively down
SLOT 5/1: Nov  9 23:09:09.057: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state
to administratively down
SLOT 5/1: Nov  9 23:09:09.173: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state
to up
SLOT 5/1: Nov  9 23:09:09.177: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state
to up
SLOT 5/1: Nov  9 23:09:09.177: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state
to up
*Nov  9 23:09:19.457: %HCCP-5-SWITCHOVERREADY: HCCP card 5/1 Mbr 50 Protect: ready to
switchover.
*Nov  9 23:09:19.457: %HCCP-5-SWITCHOVERREADY: HCCP card 5/0 Mbr 50 Working: ready to
switchover.
```

The following example shows how **to enable the** Cisco uBR10012 router **to perform a switchover** from the working line card to the protect line card using the **redundancy linecard-group** command with the **switchover from** keyword:

The following example shows how to enable the Cisco uBR10012 router to perform a switchover from the working line card to the protect line card using the**redundancy linecard-group** command with the **switchover** from keyword:

```
Router# redundancy linecard-group switchover from 5/0
*Nov  9 23:17:27.489: %HCCP-5-LC_ACTIVE: HCCP card 5/1 Mbr 50 Protect: change state to
active due to: CLI Switch.
*Nov  9 23:17:27.525: %HCCP-5-LC_STANDBY: HCCP card 5/0 Mbr 50 Working: change state to
standby due to: CLI Switch.
*Nov  9 23:17:27.525: %HCCP-5-CHANON: HCCP card 5/1 Mbr 50 Protect: turning on channel.
*Nov  9 23:17:27.525: %HCCP-6-HCCP_CHAN_RFSW_SNMP_INFO: HCCP_LC_CHAN: waits forsnmp response
 asynchronously.
*Nov  9 23:17:27.541: %SNMP-5-LINK_UP: LinkUp:Interface Wideband-Cable5/1/1:0 changed state
 to up
*Nov  9 23:17:27.541: %LINEPROTO-5-UPDOWN: Line protocol on Interface Wideband-Cable5/1/1:0,
 changed state to up
*Nov  9 23:17:27.541: %SNMP-5-LINK_UP: LinkUp:Interface Wideband-Cable5/1/1:2 changed state
 to up
*Nov  9 23:17:27.541: %LINEPROTO-5-UPDOWN: Line protocol on Interface Wideband-Cable5/1/1:2,
 changed state to up
*Nov  9 23:17:27.541: %SNMP-5-LINK_UP: LinkUp:Interface Wideband-Cable5/1/1:4 changed state
 to up
*Nov  9 23:17:27.541: %LINEPROTO-5-UPDOWN: Line protocol on Interface Wideband-Cable5/1/1:4,
 changed state to up
*Nov  9 23:17:27.905: %HCCP-6-HCCP_CHAN_RFSW_SNMP_INFO: HCCP_LC_CHAN: snmp set to rf switch
 is successful.
SLOT 5/1: Nov  9 23:17:27.597: %HCCP-6-LC_RPLC_CFGSYNC_CONFIG_RECOVER: HCCP 14 50 Protect:
 LC critical rplc_cfgsync configuration recover is succeed.
SLOT 5/1: Nov  9 23:17:27.601: %HCCP-6-LC_RPLC_CFGSYNC_CONFIG_RECOVER: HCCP 15 50 Protect:
 LC critical rplc_cfgsync configuration recover is succeed.
*Nov  9 23:17:28.121: %HCCP-3-DATA_PLANE_READY: HCCP data plane for card 5/1 member 50 is
ready.
*Nov  9 23:17:28.493: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/1/0, changed
state to up
*Nov  9 23:17:28.493: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/1/0 changed state to up
*Nov  9 23:17:28.497: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/1/1, changed
state to up
*Nov  9 23:17:28.497: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/1/1 changed state to up
*Nov  9 23:17:28.497: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/1/2, changed
state to up
*Nov  9 23:17:28.497: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/1/2 changed state to up
*Nov  9 23:17:37.801: %LINK-3-UPDOWN: Interface Modular-Cable5/1/1:0, changed state to up
*Nov  9 23:17:38.513: %HCCP-6-STATICSYNC_COMPLETED: HCCP static sync for card 5/1 member
50 is completed in 56 ms.
*Nov  9 23:17:38.801: %LINEPROTO-5-UPDOWN: Line protocol on Interface Modular-Cable5/1/1:0,
 changed state to up
*Nov  9 23:17:48.513: %HCCP-5-SWITCHOVERREADY: HCCP card 5/0 Mbr 50 Working: ready to
switchover.
*Nov  9 23:17:48.513: %HCCP-5-SWITCHOVERREADY: HCCP card 5/1 Mbr 50 Protect: ready to
switchover.
```

The following example shows how to revert from the protect line card to the working line card using the **redundancy linecard-group** command with the **revertback** keyword on the Cisco uBR10012 router:

```
Router# redundancy linecard-group revertback 5/0
```

```
*Nov  9 23:21:33.277: %HCCP-5-LC_ACTIVE: HCCP card 5/0 Mbr 50 Working: change state to
active due to: CLI Switch.
*Nov  9 23:21:33.285: %HCCP-5-LC_STANDBY: HCCP card 5/1 Mbr 50 Protect: change state to
standby due to: CLI Switch.
*Nov  9 23:21:33.297: %HCCP-5-CHANON: HCCP card 5/0 Mbr 50 Working: turning on channel.
*Nov  9 23:21:33.301: %HCCP-5-CHANOFF: HCCP card 5/1 Mbr 50 Protect: turning off channel.
*Nov  9 23:21:33.301: %HCCP-6-HCCP_CHAN_RFSW_SNMP_INFO: HCCP_LC_CHAN: waits for snmp response
 asynchronously.
*Nov  9 23:21:33.433: %UBR10000-5-UPDOWN: Interface Cable5/1/0 U2, changed state to
administratively down
*Nov  9 23:21:33.437: %UBR10000-5-UPDOWN: Interface Cable5/1/0 U1, changed state to
administratively down
*Nov  9 23:21:33.441: %UBR10000-5-UPDOWN: Interface Cable5/1/0 U0, changed state to
administratively down
*Nov  9 23:21:33.481: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state to
administratively down
*Nov  9 23:21:33.481: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state to
administratively down
Nov  9 23:21:33.585: %interface Cable5/1/0 U0 Docsis mode set to DOCSIS 1.x-only Nov  9
23:21:33.585: %Modulation profile set to 21
*Nov  9 23:21:34.277: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/0/0, changed
state to up
*Nov  9 23:21:34.277: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/0/0 changed state to up
*Nov  9 23:21:34.277: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/0/1, changed
state to up
*Nov  9 23:21:34.277: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/0/1 changed state to up
*Nov  9 23:21:34.277: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/0/2, changed
state to up
*Nov  9 23:21:34.277: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/0/2 changed state to up
*Nov  9 23:21:34.309: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/0/3, changed
state to up
*Nov  9 23:21:34.309: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/0/3 changed state to up
*Nov  9 23:21:34.309: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable5/0/4, changed
state to up
*Nov  9 23:21:34.309: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/0/4 changed state to up
*Nov  9 23:21:35.513: %LINK-3-UPDOWN: Interface Modular-Cable5/1/1:0, changed state to down
*Nov  9 23:21:36.513: %LINEPROTO-5-UPDOWN: Line protocol on Interface Modular-Cable5/1/1:0,
 changed state to down
*Nov  9 23:21:46.537: %UBR10000-5-USFREQCHG: Interface Cable5/1/0 U0, changed to Freq 10.000
 MHz
*Nov  9 23:21:46.545: %UBR10000-5-USFREQCHG: Interface Cable5/1/0 U1, changed to Freq 30.000
 MHz
*Nov  9 23:21:46.549: %UBR10000-5-USFREQCHG: Interface Cable5/1/0 U2, changed to Freq 20.000
 MHz
*Nov  9 23:21:46.581: %UBR10000-5-USFREQCHG: Interface Cable5/1/1 U0, changed to Freq 25.000
 MHz
*Nov  9 23:21:46.585: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state to up
*Nov  9 23:21:46.585: %UBR10000-5-USFREQCHG: Interface Cable5/1/1 U1, changed to Freq 15.000
 MHz
*Nov  9 23:21:46.585: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state to up
*Nov  9 23:21:46.589: %UBR10000-5-USFREQCHG: Interface Cable5/1/1 U2, changed to Freq 35.000
 MHz
*Nov  9 23:21:46.589: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state to up
*Nov  9 23:21:46.657: %SNMP-5-LINK_UP: LinkUp:Interface Cable5/1/1-upstream0 changed state
 to up
Nov  9 23:21:46.669: %interface Cable5/1/0 U0 Docsis mode set to ATDMA-only (1.x CMs will
go offline)
Nov  9 23:21:46.669: %Modulation profile set to 221
SLOT 5/1: Nov  9 23:21:46.689: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U0, changed state
to up
SLOT 5/1: Nov  9 23:21:46.693: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U1, changed state
to up
SLOT 5/1: Nov  9 23:21:46.693: %UBR10000-5-UPDOWN: Interface Cable5/1/1 U2, changed state
to up
```

```
*Nov  9 23:21:57.033: %HCCP-5-SWITCHOVERREADY: HCCP card 5/1 Mbr 50 Protect: ready to
switchover.
*Nov  9 23:21:57.033: %HCCP-5-SWITCHOVERREADY: HCCP card 5/0 Mbr 50 Working: ready to
switchover.
```

The following example shows how to trigger a switchover from working card to protect card on a Cisco cBR-8 router:

```
Router# redundancy linecard-group switchover from slot 3
```

Related Commands

Command	Description
show hccp	(Not for Cisco cBR Series Routers) Displays Hot Standby Connection-to-Connection Protocol (HCCP) group information for a specific cable interface.
show hccp interface	(Not for Cisco cBR Series Routers) Displays group information for a specific cable interface on which one or more groups and authentication modes have been configured.
show hccp linecard	(Not for Cisco cBR Series Routers) Displays information about HCCP groups associated with a line card.

redundancy reload

To manually reload a standby Route Processor (RP) module, use the **redundancy reload** command in privileged EXEC mode.

redundancy reload {**peer** | **shelf**}

Syntax Description

peer	Reloads only the standby PRE1 module or Supervisor card.
shelf	Reloads both the active and standby PRE1 module or Supervisor card.

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(4)XF1	This command was introduced for the Cisco uBR10012 router.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC.
12.2(33)SCA	This command was removed from Cisco IOS Release 12.2(33)SCA. It is replaced by the **hw-module standby-cpu reset** command.
12.2(44)SQ	This command was integrated into Cisco IOS Release 12.2(44)SQ. Support for the Cisco RF Gateway 10 was added.
15.2(4)M	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **redundancy reload peer** command is used to reset the standby RP module when there are any failures, tracebacks, or functionality and behavior mismatches on either one or both active and standby RP modules.

This command does not have an impact on active device operations, assuming a switchover is not required while the standby module is resetting.

The **redundancy reload shelf** command reloads the Cisco IOS software on both the active and standby RP modules. This command interrupts services on the router until all the RP modules and the line cards initialize and come back online.

Examples

The following example shows how to manually reload the standby RP module:

```
Router# redundancy reload peer
Reload peer? [confirm] y

Preparing to reload peer
```

Note Pressing **enter** or **y** begins the reload. Pressing any other key cancels the reload and returns control to the active RP module.

The following is sample output when a standby RP module is not installed on a router:

```
Router# redundancy reload peer
System is running in SIMPLEX mode, reload anyway? [confirm] n

Peer reload not performed.
```

The following example shows how to reload all RP modules:

```
Router# redundancy reload shelf
Reload the entire shelf [confirm] y

Preparing to reload entire shelf
```

Note Pressing **enter** or **y** begins the reload. Pressing any other key cancels the reload and returns control to the current active PRE1 module.

Cisco RF Gateway 10

The following example shows the system response when a standby Supervisor card is not installed in the Cisco RFGW-10:

```
Switch# redundancy reload peer
System is running in SIMPLEX mode, reload anyway? [confirm] n
```

Peer reload not performed.

The following example shows how to reload both Supervisor cards on the Cisco RFGW-10:

```
Switch# redundancy reload shelf
Reload the entire shelf [confirm] y

Preparing to reload entire shelf
```

Note Pressing **Enter** or **y** confirms the action and begins the reload of both cards. Pressing any other key cancels the reload and returns control to the current active Supervisor card.

Related Commands

Command	Description
associate slot	Associates slots for APS processor redundancy.
redundancy	Enters redundancy configuration mode so that the synchronization parameters can be configured.

Command	Description
redundancy force-failover main-cpu	Forces a switchover, so that the standby RP module becomes the active RP module.
redundancy switch-activity	Forces a switchover to the standby RP module.

redundancy switch-activity

To force a switchover to the standby PRE module, use the **redundancy switch-activity** command in privileged EXEC mode.

Note The terms failover and switchover are interchangeable, but switchover is the term used across all Cisco platforms capable of high-availability operation.

redundancy switch-activity [**force**]

Syntax Description

force	(Optional) Forces a switchover immediately, overriding any checks in the code or configuration that might prevent or delay a switchover.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(4)XF1	This command was introduced for the Cisco uBR10012 router.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **redundancy switch-activity** command is similar to the **redundancy force-failover main-cpu** command, except that it includes an option to force the switchover, overriding any configuration checks or other checks in the software that could prevent the switchover. In all cases, this command verifies that the standby PRE module is available and capable of performing the switchover before it transfers control to that PRE module. This command also synchronizes the current running-config and client data before initiating the switchover.

Examples

The following example shows a switchover being manually initiated, overriding any checks that might prevent or delay the switchover:

```
Router# redundancy switch-activity force
Proceed with switchover to standby PRE? [confirm] y
```

Note Pressing **enter** or **y** confirms the action and begins the switchover. Pressing any other key cancels the switchover and returns control to the current active PRE1 module.

Related Commands

Command	Description
associate	Associates two line cards for Automatic Protection Switching (APS) redundancy protection.

Command	Description
redundancy	Enters redundancy configuration mode so that the synchronization parameters can be configured.
redundancy reload	Resets the standby PRE1 module or to reset both the active and standby PRE1 modules.
redundancy force-failover main-cpu	Forces a switchover, so that the standby Performance Routing Engine (PRE1) module becomes the active PRE1 module.

registered qos-profile

Note Effective with Cisco IOS Release 12.3(9a)BC, the **registered qos-profile** command is replaced by the **qos-profile registered** command.

To specify the registered quality of service (QoS) profile that should be used for this enforce-rule, use the **registered qos-profile** command in enforce-rule configuration mode. To remove the registered QoS profile from the enforce-rule, use the **no** form of this command.

registered qos-profile *profile-id*
no registered qos-profile *profile-id*

Syntax Description

profile-id	Specifies the QoS profile to be monitored. This profile must be created on the Cisco CMTS router. If you want to manage a cable modem that uses a modem-created QoS profile, you must first create that exact QoS profile on the CMTS router before using this command. The range is 0 to 16383. The default of 0.

Command Default

The default profile ID is 0.

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.2(15)BC1	This command was introduced.
12.3(9a)BC	This command was replaced by the **qos-profile registered** command.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You must specify a registered QoS profile for each enforce-rule. The Cisco CMTS router then uses the registered profile ID to match subscribers' service flows to the proper enforce-rules.

When you change the registered QoS profile for an active rule, the cable modems that had been using the previous registered QoS profile are no longer managed by the Subscriber Traffic Management feature. Instead, the rule begins managing those cable modems that use the new registered QoS profile.

Note The registered QoS profile must be created on the Cisco CMTS router before you can assign it to an enforce-rule. If the rule does not exist, the system displays an error message. If you want to manage a CM that is using a CM-created QoS profile, you must first create a QoS profile on the Cisco CMTS router that matches the CM-created profile exactly. Then use the **registered qos-profile** command to assign that profile to this enforce-rule.

Examples

The following example shows profile 50 being assigned as the registered QoS profile to an enforce-rule:

```
Router# configure terminal

Router(config)# cable qos enforce-rule enforce-rule
Router(enforce-rule)# registered qos-profile 50
```

The following example shows the error message that is displayed when the specified QoS profile does not exist on the CMTS:

```
Router# configure terminal

Router(config)# cable qos enforce-rule test

Router(enforce-rule)# registered qos-profile 99

The qos profile 99 doesn't exist or it's a cm created QoS profile
```

Related Commands

Command	Description
activate-rule at-byte-count	Specifies the number of bytes that a subscriber can transmit during the monitoring period on a Cisco CMTS router.
cable qos enforce-rule	Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.
duration	Specifies the time period and sample rate to be used for monitoring subscribers.
enabled (enforce-rule)	Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.
penalty-period	Specifies the time period that an enforced QoS profile should be in effect for subscribers that violate their registered QoS profiles.
qos-profile enforced	Specifies a QoS profile that should be enforced when users violate their registered QoS profiles.
show cable qos enforce-rule	Displays the QoS enforce-rules that are currently defined.
show cable subscriber-usage	Displays subscribers who are violating their registered QoS profiles.

remap pid vcg

To configure custom PID remapping, use the **remap pid vcg** command in video configuration mode. PID remapping enables you to specify remap rules for all four types of processing types—data, pass-through, remap, and remux sessions.

remap pid vcg *vcg*

Syntax Description

vcg	Specifies the virtual carrier group.

Command Default

None.

Command Modes

Video configuration (config)

Command History

Release	Modification
IOS-XE 16.7.1	This command was introduced on the Cisco cBR Series Converged Broadband Router.

Examples

The following example shows a PID remap rule for a table-based unicast session on input port number 1 with vei-ip 198.51.100.1

```
logical-edge-device led1 id 1
        protocol table-based
              virtual-edge-input-ip 198.51.100.1 input-port-number 1
              vcg vcg1
              active
table-based
       vcg vcg1
             rf-channel 20
                 session unicast input-port 1 start-udp-port 49152 processing-type passthru
```

The corresponding remap rule is shown below:

```
remap pid vcg vcg1
      rf-channel 20
  vei-ip 198.51.100.1 udp-port 49152
    pid 100-200 101-201
    pid 102-130 202-230
    pid 131 240
```

rep-period

To configure the time between two ECM packets at the output, use the **rep-period** command in the DVB scrambling ECMG overrule configuration mode. To void the ECM repetition period configuration, use the **no** form of this command.

rep-period *time*
no rep-period

rep-period *time*	Specifies the ECM repetition period in milliseconds.

Command Default

None

Command Modes

DVB scrambling ECMG overrule configuration mode (config-video-encrypt-dvb-ecmg-overrule)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the time between two ECM packets at the output in milliseconds. The valid range is from 0 to 30000.

The following is an example of how to configure the ECM repetition period in milliseconds:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#overrule
Router(config-video-encrypt-dvb-ecmg-overrule)#rep-period 10000
```

Related Commands

Command	Description
overrule	Enters DVB scrambling configuration mode.
ac-start-delay	Specifies the time between start of first CP after a change in AC and start of ECM broadcast.
ac-stop-delay	Specifies the time between end of last CP preceding a change in AC and end of ECM broadcast.
max-comp-time	Specifies the maximum time needed by ECMG to compute an ECM.
max-streams	Specifies the maximum number of simultaneous open streams supported by the ECMG on a channel.

Command	Description
min-cp-duration	Specifies the minimum crypto period.
start-delay	Specifies the delay between the start of CP and ECM broadcast.
stop-delay	Specifies the delay between the end of CP and ECM broadcast.
trans-start-delay	Specifies the transition start delay.
trans-stop-delay	Specifies the transition stop delay.

report-stream-error cc-error

To enable Continuity Counter (CC) error reporting on the chassis level, use the **report-stream-error cc-error** command in video configuration mode.

report-stream-error cc-error [[report-interval *value* **] threshold** *value*

Syntax Description

report-interval *value*	Specifies the event report interval in minutes.
threshold *value*	specifies the threshold value to report the event.

Command Default

None

Command Modes

Video configuration (config-video)

Command History

Release	Modification
IOS-XE Fuji 16.8.1	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Examples

This example shows how to enable CC error reporting on the chassis level:

```
Router#configure terminal
Router(config)#cable video
Router(config-video)# report-stream-error cc-error report-interval 10 threshold value 5
```

report-stream-error input-stream-failure report-interval syslog

To configure a timeout value and syslog message for input stream failure trap for multicast sources, use the **report-stream-error input-stream-failure report-interval syslog** command in video configuration mode.

report-stream-error input-stream-failure report-interval *timeout value* **syslog** {**enable** | **disable**}

Syntax Description

timeout value	The interval after which input stream failure trap is sent if the input source down exceeds the configured timeout value. The timeout value range is 5–1800 seconds.
syslog	Enable or disable logging for for input stream stream failure trap.

Command Default

None

Command Modes

Video configuration (config-video)

Command History

Release	Modification
IOS-XE Fuji 16.8.1d	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Examples

This example shows how to configure a timeout value and syslog message:

```
Router#configure terminal
Router(config)#cable video
Router(config-video)# report-stream-error input-stream-failure report-interval 10 syslog
enable
```

Related Commands

Command	Description
showcable video snmp-alarms	Display the active alarms in the system.
show cable video snmp-alarm-config	Display the alarm configuration in the system.
snmp-trap input-stream-failure multicast	Disable input stream failure trap for EAS stream.
snmp-server enable traps video-cable	Enable alarm event traps for cable related events.

request platform hardware diagnostic load

To load the field diagnostic image and start field diagnostic test, use the **request platform hardware diagnostic load slot** *slot-id image-path* **[autostart]** command in Privileged EXEC mode.

request platform hardware diagnostic load slot *slot-id image-path* [{**autostart**}]

Syntax Description

slot *slot-id*	Specifies the slot to perform field diagnostic test.
image-path	Specifies the path of the field diagnostic image, the image can be copied to hard disk, bootflash, or USB disk.
autostart	Automatically performs the default diagnostic test after loading the field diagnostic image.

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.18.0S	This command was introduced on Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **request platform hardware diagnostic load slot** *slot-id image-path* **[autostart]** command loads the field diagnostic image and starts field diagnostic test.

Examples

The following example shows how to load the field diagnostic image and start field diagnostic test:

```
Router# request platform hardware diagnostic load slot 0 harddisk:field_diag autostart
Mar 2 16:00:51.933 CST: %IOSXE_OIR-6-REMCARD: Card (cc) removed from slot 0
Mar 2 16:00:51.934 CST: %CABLE_CLC-5-LOGGER_LC_REMOVED: Carrier Card 0 removed
```

Related Commands

Command	Description
request platform hardware diagnostic unload	Removes the field diagnostic image from the line card.
show platform hardware diagnostic status	Displays the field diagnostic tests status.

request platform hardware diagnostic unload

To unload the field diagnostic image from the line card and reload the run-time image, use the **request platform hardware diagnostic unload slot** *slot-id* command in Privileged EXEC mode.

request platform hardware diagnostic unload slot *slot-id*

Syntax Description

slot *slot-id*	Specifies the slot to unload the field diagnostic image.

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.18.0S	This command was introduced on Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **request platform hardware diagnostic unload slot** *slot-id* command unloads the field diagnostic image from the line card and reloads the run-time image.

Examples

The following example shows how to unload the field diagnostic image:

```
Router# request platform hardware diagnostic unload slot 0
Mar 2 16:04:51.860 CST: %IOSXE_OIR-6-INSCARD: Card (cc) inserted in slot 0
```

Related Commands

Command	Description
request platform hardware diagnostic load	Loads the field diagnostic image and starts field diagnostic test.
show platform hardware diagnostic status	Displays the field diagnostic tests status.

request platform software package expand

To expand the package to bootflash, use the **request platform software package expand** command in Privileged EXEC mode.

request platform software package expand file bootflash:[{**force** | **to bootflash:**[{**force** | **wipe** | [{**force**}]}] | **wipe** | [{**force**}]}]

Syntax Description

bootflash:	Expand the package to bootflash. Cisco cBR-8 router only boot from bootflash.
force	Proceed despite warnings.
wipe	Wipe destination media content first.
to	Location for contained files.

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.16.0S	This command was introduced on Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **request platform software package expand** command in Privileged EXEC mode to expand the package to bootflash.

Examples

The following example shows hwo to expand the package to bootflash:

```
router# request platform software package expand file
bootflash:subpkg_3_16/cbrsup-universalk9.03.16.00.S.155-3.S-std.SPA.bin
```

Related Commands

Command	Description
request platform software package install	Perform singe command ISSU install.

request platform software package install node

To install the package for upgrade process, use the **request platform software package install node** command in Privileged EXEC mode.

request platform software package install node {**abort** | **attach** | **file bootflash:**[{**linecard-delay** *delay* | [{**switchback**}] | **noreload** | [{**linecard**}]}] | **linecard-only**{**all** | **slot** *slot-number*} | **rollback**}

Syntax Description

abort	Cancel the ISSU process.
attach	Enables the users to view the last run log that contains the reports of all the stages of the one-shot upgrade.
file	Consolidated package file on active bootflash.
linecard-delay *delay*	By default, all the line cards will be reloaded with 240s interval during the upgrade procedure. Use **linecard-delay** *delay* option to specify the linecard reload interval.
switchback	By default, the active SUP will change to standby SUP after the upgrade procedure is complete. Use the **switchback** option to switchover the active and standby SUP at the end of upgrade procedure, so that the active SUP remains to be the active SUP after ISSU.
noreload	With **noreload** option, both the SUP and linecard will not be reloaded during the upgrade procedure. Upgrade will take effect by the next system reboot. With **noreload linecard** option, only the linecard will not be reloaded during the upgrade procedure.
linecard-only	Upgrade linecard only.
rollback	Roll back the chassis to the previous image.

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.16.0S	This command was introduced on Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on Cisco cBR Series Converged Broadband Routers. The **abort**, **linecard-only** and **rollback** keywords were added.

Usage Guidelines

Use the **request platform software package install node** command in Privileged EXEC mode to install the package for upgrade process, cancel the upgrade process, or rollback the chassis.

Examples

The following example shows how to install the package file:

```
router# request platform software package install node file
bootflash:subpkg_3_16/cbrsup-universalk9.03.16.00.S.155-3.S-std.SPA.bin
```

Related Commands

Command	Description
request platform software package expand	Expand the package to bootflash.

request platform software package install rp

To rollback to old package or implement ISSU subpackages upgrade on single SUP, use the **request platform software package instal rp** *rp-slot* **rollback** command in Privileged EXEC mode.

request platform software package install rp *rp-slot* {**file bootflash:**[{**interface-module-delay** *delay-seconds*}] | **rollback**[{**as-booted**}]}

Syntax Description

interface-module-delay *delay-second*	Specify the interface module restart timeout delay.
rollback	Un-do a previous install.
as-booted	Return to software provisioned at boot.

Command Default

None.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.16.0S	This command was introduced on Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **request platform software package instal rp** *rp-slot* **rollback** command in Privileged EXEC mode to rollback to old package.

Examples

The following example shows how to rollback the upgrade:

```
router# request platform software package install rp 0 rollback
```

Related Commands

Command	Description
request platform software package install node	Install the package for upgrade process.

request platform software process restart

To restart processes in software platform, use the **request platform software process restart** command in Privileged EXEC mode.

request platform software process restart [**interval** *secs* | **slot** *slot-number*]

Syntax Description

interval *secs*	The interval between line card reload in seconds. Valid range is from 0 to 500.
slot *slot-number*	The line card slot number. The valid range is from 0 to 9.

Command Default

This command takes effect if the new iosd and iosdb, and the us-scheduler sub-packages have been previously installed on the Supervisor. Only line cards which are both active and primary will be affected.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.16.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **request platform software process restart** command only after installing new iosd, iosdb, and us-scheduler sub-packages on the Supervisor. This command will install the new sub-packages on the line cards and restarts the affected processes.

Examples

This example shows how to restart an isod process with an interval of 10 seconds:

```
Router# request platform software process restart interval 10
    Restarting the process ubrclc_k9lc_ms
    SUCCESS: Finished Restarting the process ubrclc_k9lc_ms
    Will automatically restart process iosdb
```

This example shows how to restart a us-scheduler process:

```
Router#request platform software process restart slot 6
    Restarting the process us-scheduler on slot 6
    SUCCESS: Finished Restarting the process us-scheduler on slot 6

Router#
*Jan 23 16:51:36.160 PDT: %CMCC_CBR-4-PROC_DOWN: CLC6: cmcc:  Process us-sched (cdman) is
down
*Jan 23 16:51:36.506 PDT: %CMCC_CBR-4-PROC_RESTART: CLC6: cmcc:  Process us-sched (cdman)
restarted. Please redo any config changes
made during process restart
*Jan 23 16:51:39.737 PDT: lcpr_enqueue_reco_event: lc_slot=6 peer=6
*Jan 23 16:51:39.881 PDT: %CBR-4-RECONCL_CM_FINISH: Reconciliation (clc->sup) for slot 6
finished: total 31, success 31, failed 0,
clc-only 0, sup-only 0, mismatch 0, offline 0
```

Related Commands

Command	Description
request platform software package install	Upgrades a consolidated package or an individual sub-package.

reserve-pid-range

To configure reserved output PID range, use the **reserve-pid-range** command in video configuration mode. To delete the reserved output PID range, use the **no** form of this command.

reserve-pid-range *start-pid−end-pid*
no reserve-pid-range *start-pid−end-pid*

Syntax Description

reserve-pid-range *start-pid−end-pid*	Specifies a range of PIDs that will not be used as output for remapped sessions.

Command Default

None.

Command Modes

Video configuration (config-video)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command configures reserved output PID range.

Examples

The following example shows how to configure reserved output PID range:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# reserve-pid-range 1-10
```

Related Commands

Command	Description
show cable video logical-edge-device	Displays the logical edge device information.

reset-interval

To set the default ONID number, use the **default-onid** command in the video configuration mode.

default-onid *number*

Syntax Description

number	The ONID number. By default, the system ONID is 0, which is commonly used in North America. If the default value of the ONID is used, the TSID must be unique. If you change the ONID, the TSID-ONID pair must be unique. The ONID must be in the range of 0 to 65535.

Command Default

None.

Command Modes

Video configuration mode (config-video)

Command History

Release	Modification
Cisco IOS-XE Release 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command is used to change the deault system ONID.

The following example shows how to change the default ONID number:

```
configure terminal
cable video
default-onid 1580
```

restart-retry

To set the retry times for cable line card process restart, use the **restart-retry** *times* command in the process restart configuration mode.

`restart-retry` *times*

Syntax Description

times	Cable line card process restart retry times.

Command Default

None

Command Modes

Process restart configuration (config-process-restart)

Command History

Release	Modification
IOS-XE 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command sets the retry times for cable line card process restart.

The following example shows how to set the retry times for cable line card process restart.

```
Router# configure terminal
Router(config)# process-restart
Router(config-process-restart)# restart-retry 3
```

Related Commands

Command	Description
lc-control-plane-timeout	Sets the interval of monitoring cable line card control plane process restart.
lc-us-scheduler-timeout	Sets the interval of monitoring cable line card upstream scheduler process restart.

restricted

To convert a general load balancing group (GLBG) to a restricted load balancing group (RLBG) for DOCSIS load balancing, use the **restricted** command in the config-lb-group configuration mode. To revert to the general group type for DOCSIS load balancing, use the **no** form of this command.

restricted
no restricted

Command Default

By default, the general group type is selected for load balancing.

Command Modes

DOCSIS load balancing group mode (config-lb-group)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to convert a GLBG to a RLBG using the **restricted** command.

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)#
```

Related Commands

Command	Description
cable load-balance docsis-group	Configures a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	Displays real-time configuration, statistical, and operational information for load balancing operations on the router.

revertive

To enable the revert operation on a protect card, use the **revertive** command in line card redundancy group mode. To disable the revert operation, use the **no** form of the command.

revertive *time*
no revertive *time*

Syntax Description

time	Specifies the revert operation time in seconds. The valid values are 1 to 35791. The valid values on the Cisco cBR series routers are 10 to 86400 seconds.

Command Default

None

Command Modes

Line card redundancy group (config-red-lc)

Command History

Release	Modification
12.2(33)SCA	This command was introduced in Cisco IOS Release 12.2(33)SCA.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to specify the revert operation time for a protect card on a uBR10012 router:

```
Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# revertive 30
```

The following example shows how to specify the revert operation time on a Cisco cBR series router:

```
Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 0 internal-switch
Router(config-red-lc)# revertive 30
```

Related Commands

Command	Description
linecard-group	Creates a line card group for one-to-one line card redundancy.
redundancy	Enters redundancy mode.
member subslot	Enables the redundancy role of a line card.

rf-chan

To enter the RF channel sub configuration mode to configure an individual channel or a block of channels, use the **rf-chan** command in the controller sub configuration mode.

rf-chan *starting QAM id* *ending QAM id*

Syntax Description

starting QAM id	The starting QAM ID. The valid range is 0 to 127.
ending QAM id	The ending QAM ID. The valid range is 0 to 127.

Command Default

None.

Command Modes

Controller sub configuration mode (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command is used to enter the RF channel configuration sub-mode. If an individual channel is specified, only that channel's configuration is changed. If a block of channels is specified, the configuration change is applied to all the channels in the block.

The following example shows how to enter into the RF channel configuration sub-mode:

```
router#configure terminal
router(config)#controller integrated-cable 3/0/0
router(config-controller)#rf-chan 0 2
router(config-rf-chan)#frequency 93000000
router(config-rf-chan)#exit
router(config-controller)#exit
router#show controller integrated-Cable 3/0/0 rf-channel 0-2

Chan State Admin Frequency  Type   Annex Mod  srate Interleaver  dcid  power  output
0     UP   UP   93000000   DOCSIS  B    256   5361  I32-J4       1    34     NORMAL
1     UP   UP   99000000   DOCSIS  B    256   5361  I32-J4       2    34     NORMAL
2     UP   UP   105000000  DOCSIS  B    256   5361  I32-J4       3    34     NORMAL
```

Related Commands

Command	Description
controller integrated-cable	Enters the controller configuration mode.
frequency	Defines the RF channel frequency.
qam-profile	Defines the QAM profile number.
rf-output	Defines the QAM output mode.
type	Defines the QAM data type.
power-adjust	Defines the channel power level.

rf-channel

To enter the RF channel sub configuration mode to configure an individual channel, use the **rf-channel** command in the controller sub configuration mode.

rf-channel *number*

number	Identifies an RF channel and enters the RF channel sub configuration mode. The valid values are

Command Default

None

Command Modes

Controller sub configuration mode (config-controller)

Release	Modification
IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following is an example of how to enter the RF channel sub configuration mode:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#table-based
Router(config-video-tb)#vcg vcg1
Router(config-video-tb-vcg)#rf-channel 20
```

Related Commands

Command	Description
cable video	Enters cable video configuration mode.
table-based	Enables table-based session configuration.
vcg *name*	Specifies the virtual carrier group assigned to a logical edge device.

rf-channel (Virtual Carrier Group)

To specify the virtual RF channels in a virtual carrier group, use the **rf-channel** command in virtual carrier group configuration mode. To delete the virtual RF channels, use the **no** form of this command.

rf-channel *start-channel−end-channel* **tsid** *start-tsid−end-tsid* **output-port-number** *start-port−end-port*
no rf-channel *start-channel−end-channel* **tsid** *start-tsid−end-tsid* **output-port-number** *start-port−end-port*

Syntax Description

rf-channel *start-channel−end-channel*	Specifies the RF channel range.
tsid *start-tsid−end-tsid*	Specifies the tsid range.
output-port-number *start-port−end-port*	Specifies the output port range.

Command Default

None.

Command Modes

Virtual carrier group configuration (config-video-vcg)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the virtual RF channels.

Examples

The following example shows how to specify the virtual RF channels:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# virtual-carrier-group vod id 1
Router(config-video-vcg)# rf-channel 1-11 tsid 1-11 output-port-number 1-11
```

Related Commands

Command	Description
virtual-carrier-group	Defines a virtual carrier group.
virtual-edge-input-ip	Specifies and configures a cable multicast QoS group.
encrypt	Encrypts the virtual carrier group.
service-type	Specifies the service type of the virtual carrier group.
show cable video virtual-carrier-group	Displays the virtual carrier group information.

rf-channel (table-based vcg)

To configure the rf channel in the table-based session, use the **rf-channel** command in the table-based VCG configuration mode. To delete the configuration, use the **no** form of this command.

rf-channel *start_channel* [*–end_channel*]

start_channel–end_channel	Specifies the range of rf channels for the table-based session.

Command Default

None

Command Modes

Table-based VCG configuration mode (config-video-tb-vcg)

Release	Modification
Cisco IOS-XE 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following is an example of how to configure the rf channel in the table-based session:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#table-based
Router(config-video-tb)#vcg vcg1
Router(config-video-tb-vcg)#rf-channel 0-7
```

Related Commands

Command	Description
vcg (table-based)	Specifies the virtual carrier group associated with the table-based session.

rf-channel cable downstream channel-id

To assign a downstream channel ID to an RF channel, use the **rf-channel cable downstream channel-id** command in controller configuration mode. To remove a downstream channel ID for an RF channel, use the **no** form of this command.

rf-channel *rf-port* **cable downstream channel-id** *channel-id*
no rf-channel *rf-port* **cable downstream channel-id** *channel-id*

Syntax Description

rf-port	Specifies the RF channel physical port on the Wideband SPA FPGA. Valid values for *rf-port* depend on the configuration set with the **annex modulation** command.
channel-id	A unique channel ID. Valid values for releases prior to Cisco IOS Release 12.2(33)SCB are from 0 to 255 and the valid values for Cisco IOS Release 12.2(33)SCB and later are from 1 to 255 as 0 is reserved for network management.

Command Default

If the **rf-channel cable downstream channel-id** command is not issued, Cisco IOS software assigns a unique downstream channel ID to the RF channel.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA.
12.2(33)SCB1	The downstream channel ID scheme was changed.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

For the wideband channel to work correctly, each RF channel on the fiber node that the wideband channel uses must have a unique downstream channel ID. By default, Cisco IOS software assigns a unique downstream channel ID to the RF channel. Use the **rf-channel cable downstream channel-id** command to change the default channel ID.

The downstream channel ID that is assigned to the RF channel must be unique on the fiber node.

- The ID cannot be the same ID as is used for another RF channel on the fiber node.
- The ID cannot be the same ID as is used for a primary downstream channel on the fiber node.

You can check downstream channel IDs that are being used by examining the CMTS router configuration file.

Refer to **cable downstream channel-id** *id command for the updated downstream channel ID scheme table.*

Note If you assign a downstream channel ID that is not unique on the fiber node, the **rf-channel cable downstream channel-id** command displays an error message. The command does assign the channel ID, but the status of the fiber node becomes invalid.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command.

- For annex A and 256 QAM, each Wideband SPA supports 18 RF channels. In this case, valid values for the *rf-port* argument are 0 to 17.
- For all other cases, the SPA supports 24 RF channels. In these cases, valid values for the *rf-port* argument are 0 to 23.

Note Effective with Cisco IOS Release 12.3(23)BC, the **annex modulation** command is obsolete and **annex** and **modulation** are included as keyword options in the **rf-channel frequency** command. Also, for annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate or up to 24 RF channels at less than full rate.

Examples

The following example shows how to assign a downstream channel ID of 123 to RF channel 3 on the Wideband SPA located in slot/subslot/bay 1/0/1.

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/1
Router(config-controller)# rf-channel 3 cable downstream channel-id 123
```

Related Commands

Command	Description
annex modulation	Sets the annex and modulation for the Wideband SPA.
cable primary	Specifies that a wideband channel is a primary wideband channel.
cable rf-channel	Associates an RF channel on a Wideband SPA with a wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
ip-address (controller)	Sets the IP address of the Wideband SPA FPGA.
modular-host subslot	Specifies the modular-host line card.
rf-channel frequency	Sets the frequency for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address and UDP port for each RF channel.
rf-channel network delay	Specifies the CIN delay for each RF channel.

Command	Description
rf-channel description	Specifies the description for each RF channel.

rf-channel depi-tunnel

To bind the depi-tunnel, which inherits the configuration of the specified l2tp-class and depi-class, to an rf-channel on a shared port adapter (SPA), use the **rf-channel depi-tunnel** command in controller configuration mode. The **tsid** keyword is used to associate the logical rf-channel of the SPA to a physical quadrature amplitude modulation (QAM) on the radio frequency gateway (RFGW-10). To unbind the depi-tunnel, use the **no** form of this command.

rf-channel *rf-channel* **depi-tunnel** *depi-tunnel-name* **tsid** *id*
no rf-channel *rf-channel* **depi-tunnel** *depi-tunnel-name* **tsid** *id*

Syntax Description

rf-channel	RF channel physical port on the Wideband SPA. The allowed range is from 0 to 3.
depi-tunnel-name	Name of the DEPI tunnel.
tsid id	TS ID value.

Command Default

None

Command Modes

Global configuration (config)

Subinterface configuration (config-subif)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

To configure DEPI on the M-CMTS, bind the depi-tunnel to an rf-channel on a SPA using the **rf-channel depi-tunnel** command in controller configuration mode. To associate the logical rf-channel on the SPA to a QAM on the RFGW, use the **tsid** keyword.

Examples

The following example shows how to bind the depi-tunnel SPA0 to rf-channel 0 on a SPA and associate tsid 100 to the QAM:

```
Router# configure terminal
Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 depi-tunnel SPA0 tsid 100
```

Related Commands

Command	Description
controller modular-cable	Specifies the slot, bay, and port to be configured.
show interface modular-cable	Displays the DEPI information for the modular cable.

rf-channel description

To configure the description of an RF channel on a Wideband SPA, use the **rf-channel description** command in controller configuration mode. To remove an RF channel configuration, use the **no** form of this command.

rf-channel *rf-port* **description** *description*
no rf-channel *rf-port* **description** *description*

Syntax Description

rf-port	Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for *rf-port* depend on the configuration set with the **annex modulation** command (see the Usage Guidelines section).
description *description*	Specifies a description for the RF channel.

Command Default

No default RF channel configuration values are set for the description.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate and up to 24 RF channels at less than full rate. For all other cases, the SPA supports 24 RF channels.

Note In Cisco IOS Release 12.3(21)BC, annex and modulation parameters were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

Examples

The following example shows how to configure the description of the RF channel characteristics for RF port 0:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 description Primary downstream channel
```

Related Commands

Command	Description
cable primary	Specifies that a wideband channel is a primary wideband channel.
cable rf-channel	Associates an RF channel on a Wideband SPA with a wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
ip-address (controller)	Sets the IP address of the Wideband SPA FPGA.
modular-host subslot	Specifies the modular-host line card for Wideband protocol operations.
rf-channel cable downstream channel-id	Assigns a downstream channel ID to an RF channel.
rf-channel frequency	Sets the frequency for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address and UDP port for each RF channel.
rf-channel network delay	Configures the network delay for an RF channel.

rf-channel frequency

To configure the frequency of an RF channel on a wideband interface, use the **rf-channel frequency** command in controller configuration mode. To remove the frequency of an RF channel configuration, use the **no** form of this command.

Cisco IOS Releases 12.3(21)BC and 12.2(33)SCA

rf-channel *rf-port* **frequency** *freq*
no rf-channel *rf-port* **frequency**

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

rf-channel *rf-port* **frequency** *freq* [**annex** {**A** | **B**} **modulation** {**64** | **256**} [**interleave-depth** {**8** | **12** | **16** | **32** | **64** | **128**}]]
no rf-channel *rf-port* **frequency**

Syntax Description

rf-port	Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for *rf-port* depend on the configuration set with the **annex modulation** command (see the Usage Guidelines section).
freq	Sets the center frequency for the RF channel. Allowed range is 55000000 to 1050000000 MHz.
annex {**A**|**B**}	Specifies the MPEG framing format for each RF channel: • **A**–Annex A. The downstream is compatible with the European MPEG framing format specified in ITU-TJ.83 Annex A. • **B**–Annex B. The downstream is compatible with the North American MPEG framing format specified in ITU-TJ.83 Annex B.
modulation {**64**|**256**}	Specifies the modulation rate for each RF channel: • **64**–64-QAM • **256**–256-QAM
interleave-depth{**8** | **12** | **16** | **32** | **64**| **128**}	Indicates the downstream interleave depth. The default value is 32.

Command Default

No default RF channel configuration values are set for frequency, annex, and modulation.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
12.3(23)BC	The following keyword options were added: • **annex** • **modulation** • **interleave-depth**
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. The **annex**, **modulation**, and **interleave-depth** keyword options are not supported.
12.2(33)SCB	The **annex**, **modulation**, and **interleave-depth** keyword options are supported.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Cisco IOS Release 12.3(21)BC and Cisco IOS Release 12.2(33)SCA

This command configures the frequency for an RF channel on a Wideband SPA.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels. For all other cases, the SPA supports up to 24 RF channels.

Note In Cisco IOS 12.3(21)BC and 12.3(21a)BC3 releases, **annex** and **modulation** parameters were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

This command configures the frequency for an RF channel on a Wideband SPA. The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels. For annex A and 256 QAM, each Wideband SPA supports up to 18 RF channels at full rate. For all other cases, the SPA supports up to 24 RF channels.

For each RF channel, use the **rf-channel frequency** command in controller configuration mode to configure RF-channel characteristics. For Cisco IOS Release 12.3(21)BC, for each RF channel (*rf-port*), the frequency option *must be configured* with the **rf-channel frequency** command**.**

Uniqueness of frequency is required for all cable downstream channels on all cable interfaces and all Wideband SPAs on the CMTS.

Note Be certain to verify that the RF channel values set with **rf-channel frequency** match the values configured for the QAM outputs on the edge QAM device.The frequency value must match. If the value does not match, the Wideband SPA will not successfully communicate with the edge QAM device.

Cisco IOS Release 12.2(33)SCE

In Cisco IOS Release 12.2(33)SCE and later, changing the frequency of a single RF channel in a controller will change the frequency of all RF channels in that controller. In the event of the frequency change, all DOCSIS 3.0 cable modems will start re-registering in downstream partial service mode (p-online).

Examples

The following example shows how to configure RF channel frequency for RF port 0:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 frequency 699000000 annex A modulation 256
interleave-depth 64
```

Related Commands

Command	Description
cable primary	Specifies that a wideband channel is a primary wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
rf-channel description	Specifies the description for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address and UDP port for each RF channel.
rf-channel network-delay	Configure the network delay for an RF channel.

rf-channel group-address

To configure the DEPI multicast group address for the RF channel, use the **rf-channel group-address** command in controller configuration mode. To disable the configuration, use the **no** form of the command.

rf-channel *rf-number* **group-address** *ip-address*

no rf-channel *rf-number* **group-address**

Syntax Description

rf-number	RF channel number. The range is from 0 to 23.
ip-address	DEPI multicast group IP address.

Command Default

The DEPI multicast group address is not configured for the RF channel.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.2(33)CX	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **rf-channel group-address** command provides upstream and downstream mapping information for a specific channel group.

The following example shows how to configure the DEPI multicast group address for RF channel 0:

```
Router# configure terminal
Router# controller Modular-Cable 8/1/0
Router(config-controller)# rf-channel 0 group-address 224.0.0.1
```

Related Commands

Command	Description
controller modular-cable	Configures the DEPI controller.

rf-channel ip-address mac-address udp-port

To configure the IP address, MAC address, UDP port and DEPI remote ID of an RF channel on a Wideband SPA, use the **rf-channel ip-address mac-address udp-port** command in controller configuration mode. To remove the IP address, MAC address, UDP port and DEPI remote ID configuration of an RF channel, use the **no** form of this command.

Cisco IOS Releases 12.3(21)BC and 12.2(33)SCA

rf-channel *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* **udp-port** *portnum*
no rf-channel *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* **udp-port** *portnum*

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

rf-channel *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* {**udp-port** *portnum* | **depi-remote-id session-id**}
no rf-channel *rf-port* **ip-address** *ip-address* **mac-address** *mac-address* {**udp-port** *portnum* | **depi-remote-id session-id**}

Syntax Description

rf-port	Specifies the RF channel physical port on the Wideband SPA FPGA. Allowed range is 0 to 23. Valid values for *rf-port* depend on the configuration set with the **annex modulation** command (see the Usage Guidelines section).
ip-address	Specifies the IP address of the Gigabit Ethernet interface on the edge QAM device for this RF channel.
mac-address	Specifies the MAC address of the next-hop interface or of the edge QAM device for this RF channel.
portnum	Specifies the UDP port number for the edge QAM device that will be used for this RF channel. Allowed range is 0 to 65535.
session-id	Specifies the DEPI remote session ID to be used for encapsulation of frames in DOCSIS-MPT mode.

Command Default

None

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
12.3(23)BC	The **depi-remote-id** keyword option was added.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. The **depi-remote-id** keyword option is not supported.
12.2(33)SCB	The **depi-remote-id** keyword option is supported.

Release	Modification
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

For each RF channel, use the **rf-channel ip-address mac-address udp-port** command in controller configuration mode to configure RF-channel characteristics.

The Cisco uBR10012 router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to18 RF channels. For all other cases, the SPA supports up to 24 RF channels.

Note In the Cisco IOS Release 12.3(21)BC and 12.3(21a)BC3 releases, **annex** and **modulation** options were set globally for each SPA using the **annex modulation** command. Beginning in Cisco IOS Release 12.3(23)BC, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

For each RF channel (*rf-port*), the following items *must be configured* with **rf-channel ip-address mac-address udp-port** command:

Cisco IOS Release 12.3(21)BC and Cisco IOS Release 12.2(33)SCA

- IP address
- MAC address
- UDP port
- Associated wideband channel (see the **cable rf-channel** command)

Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB

- IP address
- MAC address
- UDP port or DEPI remote ID
- Associated wideband channel (see the **cable rf-channel** command)

The value used for *mac-address* in the *mac-address* argument is as follows:

- If a Gigabit Ethernet router or Layer 3 switch is used between the Wideband SPA and the edge QAM device, the value specified for *mac-address* is the MAC address for the next-hop interface on the router or Layer 3 switch.
- If a Gigabit Ethernet router or Layer 3 switch is not used, the value specified for *mac-address* is the MAC address for the Gigabit Ethernet interface on the edge QAM device.

The UDP port number set for the RF channel allows mapping an input UDP session to a specific QAM output port. Wideband traffic from different Wideband SPAs cannot be mixed on the same QAM output ports.

Note Be certain to verify that the RF channel values set with **rf-channel frequency** match the values configured for the QAM outputs on the edge QAM device. IP address, MAC address, UDP port, and DEPI remote ID must match. If any of these values do not match, the Wideband SPA will not successfully communicate with the edge QAM device.

Examples

The following example shows how to configure the RF channel IP address, MAC address UDP port and DEPI remote ID characteristics for RF port 0:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 ip-address 192.168.200.30 mac-address
0011-920e-a9ff udp-port 49152
```

Related Commands

Command	Description
cable primary	Specifies that a wideband channel is a primary wideband channel.
cable rf-channel	Associates an RF channel on a Wideband SPA with a wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
ip-address (controller)	Sets the IP address of the Wideband SPA FPGA.
modular-host sub-slot	Specifies the modular-host line card for Wideband protocol operations.
rf-channel cable downstream channel-id	Assigns a downstream channel ID to an RF channel.
rf-channel description	Specifies the description for each RF channel.
rf-channel frequency	Sets the frequency for each RF channel.
rf-channel network delay	Configures the network delay for an RF channel.

rf-channel network-delay

To configure the network delay for an RF channel on a Wideband SPA, use the **rf-channel network delay** command in controller configuration mode. To remove the network delay configuration for an RF channel, use the **no** form of this command.

rf-channel *rf-port* **network-delay** *delay* [**sampling-rate** *rate*]
no rf-channel *rf-port* **network-delay** *delay* [**sampling-rate** *rate*]

Syntax Description

rf-port	RF channel physical port on the Wideband SPA FPGA. The allowed range is from 0 to 23. The valid values for *rf-port* depend on the configuration set with the **annex modulation** command (see the Usage Guidelines section).
delay	Converged Interconnect Network (CIN) delay. The default value is 550 us. The allowed range is from 0 to 3000 us. The delay value auto determines the delay through DEPI Latency Measurement (DLM) packets.
sampling-rate *rate*	(Optional) Specifies how often the DLM is sent. The range is from 1 to 500 sec. The default value is 10 sec. This option is available only when the delay value is set to auto.

Command Default

None

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.3(23)BC	This command was introduced for the Cisco uBR10012 universal broadband router.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB.
12.2(33)SCC	This command was modified to include **sampling-rate** *rate* to specify how often the DLM is sent.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The Cisco uBR10012 universal broadband router supports two Wideband SPAs. Each Wideband SPA supports up to 24 RF channels depending on how the SPA is configured with the **annex modulation** command. For annex A and 256 QAM, each Wideband SPA supports up to18 RF channels. For all other cases, the SPA supports up to 24 RF channels.

Note In Cisco IOS releases 12.3(21) BC and 12.3(21a)BC3, **annex** and **modulation** parameters were set globally for each SPA using the **annex modulation** command. From Cisco IOS Release 12.3(23)BC onwards, annex and modulation values are set for each RF channel using the **rf-channel frequency** command. The **annex modulation** command is obsolete.

Examples

The following example shows how to configure the RF channel network delay characteristics for RF port 0:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 network-delay 1000
```

The following example shows how to configure the RF channel network delay characteristics for RF port 0 with a sampling-rate of 1sec:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 network-delay auto sampling-rate 1
```

Related Commands

Command	Description
cable primary	Specifies that a wideband channel is a primary wideband channel.
cable rf-channel	Associates an RF channel on a Wideband SPA with a wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
ip-address (controller)	Sets the IP address of the Wideband SPA FPGA.
modular-host subslot	Specifies the modular-host line card for Wideband protocol operations.
rf-channel cable downstream channel-id	Assigns a downstream channel ID to an RF channel.
rf-channel description	Specifies the description for each RF channel.
rf-channel frequency	Sets the frequency for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address, and UDP port for each RF channel.

rf-channel rf-power

To set the RF power output level on Cisco UBR-MC20X20V and Cisco uBR-MC88V cable interface line cards, use the **rf-channel rf-power** command in controller configuration mode. To reset the RF output power level to its default value, use the **no** form of this command.

rf-channel *rf-port* **rf-power** *power-level*
no rf-channel *rf-port* **rf-power** *power-level*

Syntax Description

rf-port	RF channel physical port on the Wideband SPA FPGA. The range is from 0 to 3. The values for *rf-port* depend on the configuration set with the **annex modulation** command.
power-level	Desired RF output power level in dBmV. The range is dependent on the cable interface line card. The format is XY.Z. By default, .Z is added as .0.

Command Default

None

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
12.2(33)SCD	This command was modified. Added support for the controller interface configuration on Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

For the Cisco UBR-MC20X20V cable interface line card, all the channels within a controller must have the same RF power value. When the RF power value is changed on any one channel, the same value is applied to all the channels within the controller. The recommended RF power range depends on the mode of the upconverter. The mode of the upconverter is decided by the highest numbered channel that is enabled.

Note RF power value outside the recommended RF power range is accepted but is automatically adjusted. If the input value exceeds the recommended RF power range, it is adjusted to a value lower than the upper limit of the range and if it is less than the recommended range, it is adjusted to a value higher than the lower limit of the range. The RF power level can be configured in decimals too.

Table below lists the recommended RF power range for different channel settings on the Cisco UBR-MC20X20V line card.

Table 1: RF Power Range on the Cisco UBR-MC20X20V Line Card

Upconverter Mode	Channel Setting	Recommended RF Power Range
Single	Only channel 0 is enabled	60.0 to 52.0 dBmV

Upconverter Mode	Channel Setting	Recommended RF Power Range
Dual	Channel 0 is either enabled or disabled. Channel 1 is enabled. Channel 2 and channel 3 are disabled.	56.0 to 48.0 dBmV
Triple	Channel 0, and channel 1 are either enabled or disabled. Channel 2 is enabled and channel 3 is disabled.	54.0 to 46.0 dBmV
Quad	Channels 0, 1, and 2 are either enabled or disabled. Channel 3 is enabled.	52.0 to 44.0 dBmV

Table below lists the recommended RF power range for different channel settings on the Cisco uBR-MC88V line card.

Table 2: RF Power Range on the Cisco uBR-MC88V Line Card

Upconverter Mode	Channel Setting	Recommended RF Power Range
Single	The RF channel stacking number equals to 1 in this mode. Channel 0 is enabled while the other channels are disabled.	45 to 63 dBmV
Dual	The RF channel stacking number equals to 2 in this mode. Channels 0 and 1 are enabled; channels 2 and 3 are disabled.	48 to 56 dBmV
Triple	The RF channel stacking number equals to 3 in this mode. Channels 0, 1, and 2 are enabled; channel 3 is disabled.	46 to 54 dBmV
Quad	The RF channel stacking number equals to 4. Channels 0, 1, 2, and 3 are enabled.	44 to 52 dBmV

Examples

The following example shows how to configure RF power for RF port 0 in modular-cable controller mode:

```
Router# configure terminal

Router(config)# controller modular-cable 1/0/0
Router(config-controller)# rf-channel 0 rf-power 50.6
```

The following example shows how to configure RF power for RF port 0 in integrated-cable controller mode:

```
Router# configure terminal

Router(config)# controller integrated-cable 1/0/0
Router(config-controller)# rf-channel 0 rf-power 50.6
```

Related Commands

Command	Description
cable primary	Specifies that a wideband channel is a primary wideband channel.
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
controller integrated-cable	Enters integrated-cable controller configuration mode.
rf-channel description	Specifies the description for each RF channel.
rf-channel ip-address mac-address udp-port	Sets the IP address, MAC address and UDP port for each RF channel.
rf-channel frequency	Configures the frequency for the RF channel.
rf-channel network-delay	Configure the network delay for an RF channel.
rf-channel rf-shutdown	Enables or disables RF output on a Wideband SPA.

rf-channel rf-shutdown

To disable the RF output on a wideband interface, use the **rf-channel rf-shutdown** command in controller configuration mode. To enable the RF output, use the **no** form of this command.

rf-channel *rf-port* **rf-shutdown**
no rf-channel *rf-port* **rf-shutdown**

Syntax Description

rf-port	Specifies the RF channel physical port. The range is from 0 to 3. The valid values for *rf-port* depend on the configuration set with the **annex modulation** command.

Command Default

RF output is disabled.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Starting with Cisco IOS Release 12.2(33)SCE, when you use the **rf-channel rf-shutdown** command, all DOCSIS 3.0 cable modems associated with the RF channel on a particular wideband interface will go offline and start re-registering in downstream partial service mode (p-online). In Cisco IOS Release 12.2(33)SCD and earlier, cable modems do not go offline while using the **rf-channel rf-shutdown** command.

For muting and unmuting the QAM on the Cisco RFGW-10, use the **rf-channel rf-shutdown** command in the M-CMTS.

Note This command cannot be executed on a Cisco 1 Gbps Wideband Shared Port Adapter (SPA) configured with manual DEPI.

Examples

The following example enables RF output on the Cisco wideband SPA:

```
Router# enable

Router# configure terminal
Router(config)# controller integrated-cable 7/1/0
Router(config-controller)# no rf-channel 0 rf-shutdown
```

Related Commands

Command	Description
controller modular-cable	Enters controller configuration mode to configure the Wideband SPA controller.
controller integrated-cable	Enters integrated-cable controller configuration mode.

Command	Description
rf-channel network-delay	Configure the network delay for an RF channel.
rf-channel rf-power	Sets the RF power output level on the Cisco UBR-MC20X20V cable interface line card.

rf-channel stacking

To suppress a carrier or mute a radio frequency (RF) channel on the Cisco uBR-MC88V cable interface line card, use the **rf-channel stacking command in** controller configuration mode. To remove the configuration, use the **no** form of this command.

rf-channel stacking *stacking-number*
no rf-channel stacking *stacking-number*

Syntax Description

stacking-number	RF channel stacking number. The range is from 1 to 4. The default value is 4.

Command Default

The RF channel stacking number is set to 4.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
12.2(33)SCD	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

If you change the default stacking number configuration, traffic loss may occur on the active channels. For example, if you change the stacking number from 4 to 2, traffic is interrupted on the RF channels 0 and 1. However, traffic loss does not occur if you do not change the stacking number configuration when shutting down an RF channel using the **rf-channel rf-shutdownrf-channel rf-shutdown** command.

Note We recommend that you do not change the default stacking number configuration. You can change the default configuration when you want RF diagnostics performed on a particular channel. For example, if you want to perform RF diagnostics on RF channel 2, you need to change the default stacking number configuration to 2 to completely mute this channel.

Examples

The following example shows how to configure the RF channel stacking number for the Cisco uBR-MC88V cable interface line card:

```
Router# configure terminal

Router(config)# controller integrated-cable 5/1
Router(config-controller)# rf-channel stacking 3
```

Related Commands

Command	Description
rf-channel rf-shutdown	Disables the RF output on a Cisco Wideband SPA, or a cable interface line card.

rf-output

To define the output mode for the RF channel, use the **rf-output** command in the RF channel sub configuration mode.

rf-output {**normal** | **alt** | **cw** | **prbs**}

Syntax Description

normal	Normal mode for production operation.
alt	Alternating symbol (two-tone). Diagnostic mode for hardware testing.
cw	Continuous Wave. Diagnostic mode for hardware testing.
prbs	Pseudo Random Binary Sequence. Diagnostic mode for hardware testing.

Command Default

None.

Command Modes

RF channel sub configuration mode (config-rf-chan)

Usage Guidelines

This command is used to define the output mode for the RF channel.

The following example shows how to change the output mode:

```
router#configure terminal
router(config)#controller integrated-cable 3/0/0
router(config-controller)#rf-chan 5 10
router(config-rf-chan)#frequency 723000000
router(config-rf-chan)#rf-output alt
router(config-rf-chan)#exit
router(config-controller)#exit
router(config)#exit
router#show controller integrated-Cable 3/0/0 rf-channel 5 10
Chan State Admin Frequency  Type   Annex Mod  srate Interleaver  dcid  power  output
 5   TEST   UP   723000000  DOCSIS  B    256   5361  I32-J4       164  34     ALT
 10  TEST   UP   753000000  DOCSIS  B    256   5361  I32-J4       169  34     ALT
```

Related Commands

Command	Description
controller integrated-cable	Enters the controller configuration mode.
frequency	Defines the RF channel frequency.
qam-profile	Defines the QAM profile number.
rf-chan	Enters the RF channel sub configuration mode.
type	Defines the QAM data type.
power-adjust	Defines the channel power level.

rf-port integrated-cable

To define the physical slot/bay/port to be used in a video service, to define the Service Distribution Group (SDG) use the **rf-port integrated-cable** command in the service distribution group configuration mode. To delete the physical slot/bay/port, use the **no** form of the command.

rf-port integrated-cable *slot/bay/port*

Syntax Description

slot	The line card slot number. Slot can be configured from 0-3 or 6-9. Slots 4 and 5 are the supervisor slots.
bay	The Cisco cBR-8 chassis number. This is always configured as 0.
port	The RF port number. This can be configured from 1-8.

Command Default

None.

Command Modes

Service distribution group configuration mode (config-video-sdg)

Command History

Release	Modification
Cisco IOS-XE Release 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command is used to define the physical slot/bay/port to be used in a video service, to define the SDG. To configure QAM replication for service group size alignment between the DOCSIS and video services to one or more ports, you can add more ports into the service distribution group configuration. Make sure that the controller type is video for the slot/bay/port that you would use for the SDG. For more information, see the Video QAM Carriers section here: http://www.cisco.com/c/en/us/td/docs/cable/cbr/configuration/guide/b_cbr_basic_config_prov_construct/video_qam_carriers.html.

The following example shows how to define the physical slot/bay/port :

```
router#configure terminal
router(config)#cable video
router(config-video)#service-distribution-group sdgid 1
router(config-video-sdg)#rf-port integrated-cable 7/0/0
router(config-video-sdg)#rf-port integrated-cable 7/0/1
```

Related Commands

Command	Description
service-distribution-group	Defines a service distribution group.
onid	Override the default ONID.
psi-interval	Override the default PSI value.
show cable video service-distribution-group	Displays the SDG configuration.

rf-switch auxport enable

To enable the AUX port of the RF switch, use the **rf-switch auxport enable** command in redundancy mode. To disable the AUX port, use the **no** form of this command.

rf-switch auxport enable
no rf-switch auxport

Syntax Description

enable	Enables the Cisco NGRFSW-ADV. In the default configuration, the Cisco NGRFSW-ADV is disabled. When the Cisco NGRFSW-ADV is enabled, the Cisco CMTS router starts polling the Cisco NGRFSW-ADV at a set interval to check its status.

Command Default

The AUX port of the Cisco NGRFSW-ADV is disabled by default.

Command Modes

Redundancy mode (config-red)

Command History

Release	Modification
12.2(33)SCG	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to enable the AUX port of the Cisco NGRFSW-ADV:

```
Router> enable
Router# configure terminal
Router(config)# redundancy
Router(config-red)# linecard-group 1 cable
Router(config-red-lc)# rf-switch auxport enable
```

Command History

The **rf-switch auxport enable** command is used to configure the Cisco uBR Advanced RF Switch (NGRFSW-ADV). See Cisco uBR Advanced RF Switch Software Configuration Guide .

Related Commands

Command	Description
linecard-group id cable	Assigns the Hot Standby Connection-to-Connection Protocol (HCCP) group to all interfaces on the cable interface line card, or Cisco Broadband Processing Engine.
show redundancy linecard	Displays information about a redundant line card or line card group.

roll-off

To specify the channel roll-off value, use the **roll-off** command in OFDM channel profile configuration mode. To undo the channel roll-off value assignment, use **no** form of this command.

roll-off *value*

no profile-control

Syntax Description

value	The channel roll-off value. Valid values are 64, 128, 192, and 256.

Command Default

128

Command Modes

OFDM channel profile configuration (config-ofdm-chan-prof)

Command History

Release	Modification
IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the channel roll-off value.

Examples

The following example shows how to specify the channel roll-off value:

```
Router# configure terminal
Router(config)# cable downstream ofdm-chan-profile 21
Router(config-ofdm-chan-prof)# roll-off 128
```

Related Commands

Command	Description
cable downstream ofdm-chan-profile	Define the OFDM channel profile on the OFDM channel.
cyclic-prefix	Specify the channel cyclic-prefix.
description (OFDM channel profile)	Specify a user defined description for the profile.
interleaver-depth	Specify the channel interleaver-depth.
pilot-scaling	Specify the value used to calculate the number of continuous pilots.
profile-data	Specify default modulation or profile as the channel data profile.
profile-ncp	Specify default modulation or profile as the channel ncp profile.
profile-control	Specify default modulation or profile as the channel control profile.
subcarrier-spacing	Specify the spacing for specific subcarriers configured in this profile.

route-ecmg

To configure the route to the ECMG server for session based scrambling, use the **route-ecmg** command in the DVB scrambling configuration mode. To void the route configuration, use the **no** form of this command.

route-ecmg *ip_address netmask interface forwarding_router_ip*
no route-ecmg *ip_address netmask interface forwarding_router_ip*

ip_address	Specifies the IP address of the ECMG server.
netmask	Specifies the netmask of the connection.
interface	Specifies the interface of the connection.
forwarding_router_ip	Specifies the IP address of the forwarding router.

Command Default

None

Command Modes

DVB scrambling configuration mode (config-video-encrypt-dvb)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following is an example of how to configure the route to the ECMG server:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#route-ecmg 1.200.1.0 255.255.255.0 TenGigabitEthernet 4/1/2
 1.200.1.1
```

Related Commands

Command	Description
dvb	Enters DVB scrambling configuration mode.
strong-pairing-enforce	Switches on the NDS strong pairing enforcement
check-scg-at-prov	Enables Check SCG at provision time.
scramble-video-audio	Scrambles only video and audio pids.
mgmt-ip	Configures the manangement IP for EIS/Broadcast ECMG.
ca-interface	Configures the conditional access interface.
tier-based	Enters the tier-based scrambling configuration mode.

Command	Description
ecmg	Enters the ECM Generator configuration mode.
eis	Enters the Event Information Scheduler configuration mode.

routing-interface-ip

To automatically configure IP addresses of line card video interfaces from a pool of IP addresses that you provide, use the **routing-interface-ip** command.

routing-interface-ip *ip-address* *ip-mask* { **secondary** *ip-address* *ip-mask* }

Syntax Description

ip-address	Specifies the starting IP address of the line card video interfaces.
ip-mask	Specifies the IP mask IP address.
secondary	Specifies the secondary interface of the line card video interfaces.

Command Modes

Video configuration mode (config-video)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Do not change the video interface IP configuration unless there are conflicts with customer subnets.

Video interface IP configuration is optional. By default, the Cisco cBR-8 uses 10.100.x.x subnets for primary IP addresses and 10.101.x.x subnets for secondary IP addresses of video interfaces. By default, all video interfaces are in the VRF *Mgmt-MPEG-video-intf.*

Configure the video interface IP before configuring any other video-specific configurations like logical edge device and virtual service group configurations. Use the **routing-interface-ip** only when the default configuration conflicts with the existing subnets in the network.

routing-interface-vrf

To configure user-specific VRF to line card video interfaces, use the **routing-interface-vrf** command in video configuration mode. To remove the user-specific VRF configuration, use the **no** form of this command.

routing-interface-vrf slot *slot* **vrf-name** *vrf-name*

Syntax Description

slot	Slot where the line card resides. The valid range is 0–3 and 6–9.
vrf-name	Name of the user-specific VRF

Command Modes

Video configuration mode (config-video)

Command History

Release	Modification
Cisco IOS XE Amsterdam 17.3.1x	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Virtual routing and forwarding configuration is optional. Use the **routing-interface-vrf** only when the video interface participates in NX-MVPN profile 12 or profile 14.

Do not use the **routing-interface-vrf** command for legacy L3VPN.

By default, all video interfaces are in the VRF *Mgmt-MPEG-video-intf*.

Configure VRF separately for each line card that is participating in NX-MVPN.

Configure virtual routing and forwarding before configuring any other video-specific configurations like logical edge device, virtual carrier group, or service distribution group configurations.

rpd-ds downstream-cable

To configure the downstream controller in the RPD, use the **rpd-ds downstream-cable** command in RPD core-interface configuration mode. To void the downstream controller configuration in the RPD, use the **no** form of this command.

rpd-ds 0 downsteam-cable *slot/subslot/port* **profile** *id*

no rpd-ds 0 downsteam-cable *slot/subslot/port*

Syntax Description

slot/subslot/port	Specifies the slot, subslot and port of the downstream controller.

Command Default

None

Command Modes

RPD conre-interface configuration (config-rpd-core)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to configure the downstream controller in the RPD.

The following example shows how to configure the downstream controller in the RPD:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# core-interface tengigabitethernet 3/1/0
Router(config-rpd-core)# rpd-ds 0 downstream-cable 9/0/0 profile 0
```

Related Commands

Command	Description
core-interface	Configures the core-interface of the RPD.
rpd-us upstream-cable	Configures the upstream controller in the RPD.

rpd-ds downstream-oob-vom

To specify the downstream virtual OM and OOB profile, use the **rpd-ds downstream-oob-vom** command in RPD core-interface configuration mode. To void the downstream virtual OM and OOB profile assignment, use the **no** form of this command.

rpd-ds 0 downstream-oob-vom *o-id* **profile** *dp-id*

no rpd-ds 0 downstream-oob-vom

Syntax Description

o-id	Specifies the ID of the virtual OM previously configured.
dp-id	Specifies the ID of the downstream OOB profile previously configured.

Command Default

None

Command Modes

RPD conre-interface configuration (config-rpd-core)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the downstream virtual OM and OOB profile.

The following example shows how to specify the downstream virtual OM and OOB profile:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# core-interface tengigabitethernet 3/1/0
Router(config-rpd-core)# rpd-ds 0 downstream-oob-vom 1 profile 3
```

Related Commands

Command	Description
virtual-om	Defines a virtual OOB modulator configuration.
controller downstream-oob 55d1-profile	Configures the OOB downstream controller profile.

rpd-event

To specify the RPD event reporting profile to use in RPD, use the **rpd-event** command in RPD configuration mode. To void the RPD event reporting profile specification, use the **no** form of this command.

rpd-event profile *id*

no rpd-event profile

Syntax Description

id	Specifies the ID of the RPD event reporting profile previously created.

Command Default

None

Command Modes

RPD configuration (config-rpd)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the RPD event reporting profile.

The following example shows how to specify the RPD event reporting profile:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# rpd-event profile 1
```

rpd-us upstream-cable

To configure the upstream controller in the RPD, use the **rpd-us upstream-cable** command in RPD core-interface configuration mode. To void the upstream controller configuration in the RPD, use the **no** form of this command.

rpd-us *port* **upsteam-cable** *slot/subslot/port* **profile** *id*

no rpd-us *port* **upsteam-cable** *slot/subslot/port*

Syntax Description

slot/port/interface	Specifies the slot, subslot and port of the upstream controller.

Command Default

None

Command Modes

RPD conre-interface configuration (config-rpd-core)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Description

Specifies a description for the upstream controller profile. The maximum length is 20 characters. This field is set to NULL by default. Different upstream controller profiles on the RPD ports can be easily distinguished if a description is specified.

Usage Guidelines

Use this command to configure the upstream controller in the RPD.

The following example shows how to configure the upstream controller in the RPD:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# core-interface tengigabitethernet 3/1/0
Router(config-rpd-core)# rpd-us 0 upstream-cable 9/0/0 profile 122
```

Related Commands

Command	Description
core-interface	Configures the core-interface of the RPD.
rpd-ds downstream-cable	Configures the downstream controller in the RPD.

rpd-us upstream-oob-varpd

To specify the upstream virtual ARPD and OOB profile, use the **rpd-us upstream-oob-varpd** command in RPD core-interface configuration mode. To void the upstream virtual ARPD and OOB profile assignment, use the **no** form of this command.

rpd-us *port* **upstream-oob-varpd***a-id* **profile** *up-id*

no rpd-us *port* **upstream-oob-varpd**

Syntax Description

a-id	Specifies the ID of the virtual ARPD previously configured.
up-id	Specifies the ID of the upstream OOB profile previously configured.

Command Default

None

Command Modes

RPD conre-interface configuration (config-rpd-core)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the upstream virtual ARPD and OOB profile.

The following example shows how to specify the upstream virtual ARPD and OOB profile:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# core-interface tengigabitethernet 3/1/0
Router(config-rpd-core)# rpd-us 0 upstream-oob-varpd 1 profile 3
```

Related Commands

Command	Description
virtual-arpd	Defines a virtual ARPD configuration.
controller upstream-oob 55d1-profile	Configures the OOB upstream controller profile.

rpd downstream-cable

To specify the RPD in the SDG, use the **rpd downstream-cable** command in SDG configuration mode. To void the RPD assignment in the SDG, use the **no** form of this command.

rpd downsteam-cable *slot/bay/port*

no rpd downsteam-cable *slot/bay/port*

Syntax Description

slot/bay/port	Specifies the slot, bay and port of the downstream cable interface.

Command Default

None

Command Modes

service distribution group configuration (config-video-sdg)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to configure the downstream controller in the RPD.

The following example shows how to configure the downstream controller in the RPD:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# core-interface tengigabitethernet 3/1/0
Router(config-rpd-core)# rpd-ds 0 downstream-cable 9/0/0 profile 0
```

Related Commands

Command	Description
core-interface	Configures the core-interface of the RPD.
rpd-us upstream-cable	Configures the upstream controller in the RPD.

sbfd

To configure the SBFD, use the **sbfd** command in RPD configuration mode. To void the SBFD configuration, use the **no** form of this command.

sbfd {sbfd | inteval *milliseconds* **multiplier** *value***}**

no sbfd {enable | interval}

Syntax Description

milliseconds	Specifies interval in milliseconds.
value	Specifies the value to multiply the interval.

Command Default

None

Command Modes

RPD configuration (config-rpd)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to configure SBFD.

The following example shows how to configure SBFD:

```
Router# configure terminal
Router(config)# cable rpd 1
Router(config-rpd)# no sbfd enable
```

scramble-video-audio

To scramble only video and audio pids, use the **scramble-video-audio** command in the DVB scrambling configuration mode. To scramble all elementary streams, use the **no** form of this command.

scramble-video-audio
no scramble-video-audio

Command Default

None

Command Modes

DVB scrambling configuration mode (config-video-encrypt-dvb)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

When **scramble-video-audio** is configured, the elementary streams other than video and audio are not scrambled.

The following is an example of how to scramble only video and audio pids:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#scramble-video-audio
```

Related Commands

Command	Description
dvb	Enters DVB scrambling configuration mode.
strong-pairing-enforce	Switches on the NDS strong pairing enforcement
check-scg-at-prov	Enables Check SCG at provision time.
route-ecmg	Configures the route to the ECMG server.
mgmt-ip	Configures the manangement IP for EIS/Broadcast ECMG.
ca-interface	Configures the conditional access interface.
tier-based	Enters the tier-based scrambling configuration mode.
ecmg	Enters the ECM Generator configuration mode.
eis	Enters the Event Information Scheduler configuration mode.

secondary aux

To enable the auxiliary port on the standby PRE1 module, use the **secondary aux** command in redundancy configuration (main-cpu) mode. To disable the auxiliary port, use the **no** form of this command.

secondary aux
no secondary aux

Syntax Description

This command has no keywords or arguments.

Command Default

The auxiliary port on the standby PRE1 module is disabled.

Command Modes

Redundancy configuration, main-cpu mode

Command History

Release	Modification
12.2(11)BC3	This command was introduced for the Cisco uBR10012 router.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to enable the auxiliary port on the standby PRE1 module.

```
Router# config t

Router(config)# redundancy

Router(config-r)# main-cpu

Router(config-r-mc)# secondary aux
Router(config-r-mc)# exit

Router(config-f)# exit

Router(config)#
```

Related Commands

Command	Description
main-cpu	Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules.
redundancy	Configures the synchronization of system files between the active and standby PRE1 modules.
redundancy force-failover main-cpu	Forces a manual switchover between the active and standby PRE1 modules.

server

To define the server IP address of the session resource manager, use the **server** command in the logical edge device protocol configuration mode. To reset to default configuration, use the **no** form of this command.

server *ip-address*
no server *ip-address*

Syntax Description

ip-address	Specifies the server IP address of the session resource manager.

Command Default

None

Command Modes

Logical edge device protocol configuration (config-video-led-protocol)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command defines the server IP address of the session resource manager.

Examples

The following example shows how to define the server IP address of the session resource manager:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)#logical-edge-device vod id 1
Router#(config-video-led)protocol gqi
Router#(config-video-led-protocol)server 172.16.3.75
```

Related Commands

Command	Description
logical-edge-device	Defines a logical edge device.
protocol	Specifies the protocol used in the logical edge device.
mgmt-ip	Defines the local management IP address for a logical edge device.
mac-address	Defines the MAC address for a logical edge device.
vcg	Specifies the virtual carrier group assigned to the logical edge device.
virtual-edge-input-ip	Defines a virtual edge input.
show cable video logical-edge-device	Displays the logical edge device information.
show cable video gqi connections	Displays the GQI connection information of the logical edge device with the Session Resource Manager.

Command	Description
show diag all eeprom detail | include MAC	Displays the chassis MAC address information.

service divert-limit

To set the layer 3 mobility threshold limit, use the **service divert-limit** command in global configuration mode. To set the default value, use the **no** form of this command.

service divert-limit {**l3-mobility-counter** *limit* | **l3-mobility-timeslot** *timeslot* }
no service divert-limit {**l3-mobility-counter** *limit* | **l3-mobility-timeslot** *timeslot* }

Syntax Description

l3-mobility-counter	Sets the layer 3 CPE mobility counter threshold.
limit	Specifies the mobility counter threshold limit in packets. The range is from 1 to 127. The default is 16.
l3-mobility-timeslot	Sets the layer 3 CPE mobility time slot configuration.
timeslot	Specifies the mobility time slot in milliseconds. The range is from 1 to 4095. The default is 300.

Command Default

This **divert-limit l3-mobility-counter** default value is 16 packets and **divert-limit l3-mobility-timeslot** default value is 300 ms.

Command Modes

Global configuration (config)

Command History

12.2(33)SCH2	The command was introduced.
IOS-XE 3.15.0S	This command was replaced by the **platform punt-sbrl subscriber** command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

If the **cable l3-mobility** command is enabled, the **service divert-limit** command is also enabled by default. This command is usually used to modify the default value.

Note This command does not work if **cable l3-mobility** command is disabled.

Examples

The following example shows how to set the CPE mobility threshold and time slot:

```
Router # enable
Router # configure terminal
Router (config) # service divert-limit l3-mobility-counter 127
Router (config) # service divert-limit l3-mobility-timeslot 4095
```

Related Commands

Command	Description
cable l3-mobility	Enables mobility for a particular IPv4 or IPv6 subnet.

service divert-rate-limit

Note Effective with Cisco IOS Release 12.2(33)SCB, the **service divert-rate-limit** *fib-rp-glean* command is replaced on the WAN-side by the **service divert-rate-limit ip** *fib-rp-glean* command. See the **service divert-rate-limit ip** command for more information. The **service divert-rate-limit** *fib-rp-glean* command is replaced on the WAN-side non-IP by **service divert-rate-limit non-ip** *fib-rpf-glean* command. See the **service divert-rate-limit non-ip** command for more information. For cable-side DRL configuration, see the **cable divert-rate-limit** command.

To configure PXF Divert-Rate-Limit, use the **service divert-rate-limit** command in global configuration mode. To reset this feature to the default parameters, use the no form of this command.

service divert-rate-limit *divert-code rate* [**limit** *limit*]
no service divert-rate-limit *divert-code*

Syntax Description

divert-code rate	Configures the PXF Divert-Rate-Limit for the any of the following packets: • fwd-glean—Packets that hit a glean adjacency in the FIB. • rpf-glean—Packets that hit a glean adjacency during the RPF check. The range is from 1 to 255 packet-per-second. The default rate is 20 packets-per-second.
limit *limit*	(Optional) Sets the limit for the number of packets that will be diverted in an initial burst of packets. The range is from 4 to 255 packets. The default limit is 5 packets. **Note** Setting the limit has a limited effect on the behavior of the algorithm, so this part of the CLI is hidden.

Command Default

Divert-Rate-Limit contains the following default behavior and values:

- Divert-Rate-Limit is always active.
- The default rate is 20 packets-per-second.
- The default limit is 5 packets.

Command Modes

Global configuration (config)

Command History

12.3(17a)BC	The command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.
12.2(33)SCA	This command was integrated into Cisco IOS release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.

12.2(33)SCB	This command was replaced by the **service divert-rate-limit ip** *fib-rp-glean* command and **service divert-rate-limit non-ip** *fib-rpf-glean* command.
IOS-XE 3.15.0S	This command was replaced by the **platform punt-sbrl subscriber** command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The**service divert-rate-limit** command is used to configure the PXF Divert-Rate-Limit for fwd-glean and rpf-glean packets in order to identify packet streams that will cause congestion of the FP-to-RP interface.

Examples

The following example shows how to configure rate-limiting for fib-rp-glean, with a rate of 10 packets-per-second and a limit of 20 packets:

```
Router(config-if)# service divert-rate-limit fib-rp-glean 10 limit 20
```

The following example shows how to return rate-limiting for fib-rp-glean to the default values:

```
Router(config-if)# no service divert-rate-limit fib-rp-glean
```

Pass and fail counters are kept for fwd-glean, rpf-glean, and cable-ARP packets. To show the statistics for the pass and fail counter, use the **show pxf cpu statistics drl** command:

```
Router(config-if)# show pxf cpu statistics drl
 Divert-Rate-Limit statistics
    code          total                diverted             dropped
  fib_rpf_glean   500                  59                   441
  fib_rp_glean    500                  54                   446
  arp_filter      0                    0                    0
```

Note The arp_filter stats shown above are global stats for PXF ARP Filtering. These stats cannot be cleared by the CLI. However, they will reset to zero upon reload.

Packets dropped by Divert-Rate-Limit and the ARP Filter will be recorded in the regular PXF drop statistics:

```
Router(config-if)# show pxf cpu statistics drop c5/0/0

 FP drop statistics for Cable5/0/0
                              packets            bytes
     vcci undefined           0                  0
   vcci C
     ...
     divert_rate_limit        441                28224
     arp_filter_reply         0                  0
     arp_filter_request       0                  0
```

Related Commands

Command	Description
show cable arp-filter	Displays the total number of Address Resolution Protocol (ARP) offenders.

service divert-rate-limit ip

To set DRL rate and limit for WAN-side IP packet streams, use the **service divert-rate-limit ip** command in global configuration mode. To reset the *rate* and *limit* to the default values for all IP divert-codes, use the **no** form of this command. Using **no service divert-rate-limit ip** *divert-code* will reset rate and limit to the default values for the specified divert code.

service divert-rate-limit ip *divert-code* **rate** *rate* **limit** *limit*
no service divert-rate-limit ip

Syntax Description

divert code	Specifies the applicable divert code.
rate	Specifies the divert rate in packets per second. Minimum rate is 1 packet per second. Maximum rate is 65535 packets per second. For WAN-side IP packets, the default rate is 4000 packets per second
limit	Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets. For WAN-side IP packets, the default limit is 4000 packets.

Command Default

For WAN-side IP packet streams, the default rate is 4000 packets per second and default limit is 4000 packets. These defaults apply to each uniquely identified IP packet stream.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCB	This command was introduced. The **service divert-rate-limit ip** *fib-rp-glean* command is the WAN-side replacement for the **service divert-rate limit** *fib-rp-glean* command.
IOS-XE 3.15.0S	This command was replaced by the **platform punt-sbrl wan** command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You can configure a rate and limit for a particular IP divert-code for WAN-side IP packets. However, each IP packet-stream is uniquely identified (using a hash of the VRF, the IP source address, and the divert-code), and then packets in that stream are sent through a rate-limiter with the configured rate and limit.

Examples

The following example shows how to set the rate and limit for the specified divert code:

```
Router(config)# service divert-rate-limit ip fib-rp-glean rate 1 limit 4
```

Related Commands

Command	Description
service divert-rate-limit non-ip	This command configures DRL for WAN-side non-IP packet streams.

Command	Description
service divert-rate-limit trusted-site	This command adds entries to the trusted site list.

service divert-rate-limit ipv6

To set the divert rate limit (DRL) rate and limit for WAN-side IPv6 packet streams, use the **service divert-rate-limit ipv6** command in global configuration mode.

service divert-rate-limit ipv6 *divert-code* **rate** *rate* **limit** *limit*
no service divert-rate-limit ipv6

Syntax Description

divert-code	Specifies the applicable divert code.
rate	Specifies the divert rate in packets per second. Minimum rate is 1 packet per second. Maximum rate is 65535 packets per second. For WAN-side IPv6 packets, the default rate is 4000 packets per second.
limit	Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets. For WAN-side IPv6 packets, the default limit is 4000 packets.

Command Default

For WAN-side IPv6 packet streams, the default rate is 4000 packets per second and default limit is 4000 packets.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCE	This command was introduced.
IOS-XE 3.15.0S	This command was replaced by the **platform punt-sbrl wan** command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You can configure rate and limit for a particular IPv6 divert-code for WAN-side IP packets. However, each IP packet-stream is uniquely identified (using a hash of the VRF, the IP source address, and the divert-code), and then packets in that stream are sent through a rate-limiter with the configured rate and limit.

This command is supported only on PRE4.

Use the **diversion** option of the **show pxf cpu statistics** command to troubleshoot the divert code, before configuring the DRL.

To configure the correct divert code, refer to the list of divert codes.

Table 3: List of divert codes

Divert Code	Description
6pe_dst_linklocal	6PE dst linklocal
6pe_dst_mcast	6PE dst multicast

Divert Code	Description
6pe_ttl	6PE ttl
icmpv6	IPv6 ICMP
ipv6_cable_filter_ds	ipv6 cable filter ds
ipv6_dhcp_ucast	IPv6 unicast DHCP
ipv6_hopopts	IPv6 HopOpts
ipv6_lng_ext_hdr	IPv6 long extension hdr
ipv6_mcast_rsvd	IPv6 multicast
ipv6_nd_na_mcast	IPv6 ND NA (multicast)
ipv6_nd_na_ucast	IPv6 ND NA (unicast)
ipv6_nd_ns_mcast	IPv6 ND NS (multicast)
ipv6_nd_ns_ucast	IPv6 ND NS (unicast)
ipv6_nd_rs_mcast	IPv6 ND RS (multicast)
ipv6_rp_dest	IPv6 receive adjacency
ipv6_rp_glean	IPv6 glean adjacency
ipv6_rp_pbr	IPv6 RP PBR
ipv6_rp_punt	IPv6 punt adjacency
ipv6_src_linklocal	IPv6 SRC LinkLocal
ipv6_src_ver_lq_req	IPv6 src ver leasequery request
ipv6_src_ver_mac_req	IPv6 src ver MAC request

Note To reset the *rate* and *limit* to the default values for all IPv6 divert-codes, use the no form of this command. Using **no service divert-rate-limit ipv6** *divert-code* will reset *rate* and *limit* to the default values for the specified divert code.

Examples

The following example shows how to set the rate and limit for the specified divert code:

```
Router(config)# service divert-rate-limit ipv6 ipv6_rp_glean rate 20 limit 10
Router(config)#
```

Related Commands

Command	Description
service divert-rate-limit trusted-site	Adds IPv4-specific entries to the trusted site list.
service divert-rate-limit non-ip	Configures DRL for WAN-side non-IP packet streams.
service divert-rate-limit trusted-site-ipv6	Adds IPv6-specific entries to the trusted site list.
show pxf cpu statistics	Displays Parallel eXpress Forwarding (PXF) CPU statistics.

service divert-rate-limit ip trusted-site

To add entries to the trusted site list, use the **service divert-rate-limit ip trusted-site** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

service divert-rate-limit ip trusted-site *ip-address* **mask** *ip-address* **tos** *tos-value* **mask** *tos-mask* **vrf** *vrf-name*
no service divert-rate-limit ip trusted-site *ip-address* **mask** *ip-address* **tos** *tos-value* **mask** *tos-mask* **vrf** *vrf-name*

Syntax Description

ip-address	Specifies the source IP address that should be matched.
mask *ip-address*	The mask to apply to the source IP address of the packet before testing if it matches. There are no restrictions on the mask value.
tos *tos-value*	The ToS value of the trusted site. There are no restrictions on the tos_value. Example: 0xD0
mask *tos-mask*	The mask to apply to the IP ToS value and the trusted-site tos_value before testing if it matches. There are no restrictions on the tos_mask value. Example: 0xF3 **Note** The ToS value can be wild-carded by setting the tos_mask to 0x00
vrf *vrf-name*	The VRF that this trusted site applies to. For the global VRF, use the **global** keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the *tos-mask*. If a non-existent VRF is specified, the table entry is filled, but the information is not written to toaster memory. If the specified VRF is subsequently created, the information is written to toaster at that time.

Command Default

None

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **service divert-rate-limit ip trusted-site** command is used to configure trusted site list that contains a source IP address and mask, IP ToS value and mask, and a VRF. If no IP address is specified, the entire trusted site list is cleared. The trusted site list contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list applies only to WAN-IP IPv4 packets. There is a limitation of four trusted sites.

Examples

The following example shows how to configure trusted site list:

```
Router(config
)# service divert-rate-limit trusted-site 192.0.13.2 255.255.255.0
  tos 0xD0 mask 0xF3 vrf name1
```

Related Commands

Command	Description
service divert-rate-limit non-ip	This command sets and limit default values for the specified divert code.

service divert-rate-limit max-rate us-cable

To set per-divert-code rate limit on the upstream cable interface, use the **service divert-rate-limit max-rate us-cable** command in global configuration mode. To reset the divert-rate-limit parameters to the default values for all divert-codes, use the no form of this command.

service divert-rate-limit max-rate us-cable *divert-code* **rate** *rate* **limit** *limit*

Syntax Description

divert-code Configures the divert-rate-limit for any of the following packets:

- mfib_224_0_0_x—The Packet whose destination IP is 224.0.0.x.
- icmpv6—IPv6 ICMP
- mfib_igmp—IGMP protocol packet
- ipv6_nd_na_mcast—IPv6 ND NA (multicast)
- ipv6_nd_na_ucast—IPv6 ND NA (unicast)
- ipv6_nd_ns_mcast—IPv6 ND NS (multicast)
- ipv6_nd_ns_ucast—IPv6 ND NS (unicast)
- fib_rp_dest— IPv4 packets targeting to CMTS.
- fib_rp_dest_precedence—The packet whose destination is RP and has non-zero precedence value in IP header.
- fib_rp_glean—FIB glean adjacency used for IPv4 adjacency resolving.
- fib_rp_punt—FIB punt adjacency used for IPv4 adjacency resolving.
- src_ver_leasequery_req—Divert to RP due to zero MD and sid value and need to send lease query to DHCP server for those packets.
- src_ver_unknown_ip_addr—Divert to RP due to zero MD and sid value and no adjacency information for source IP address of those packets.
- ipv6_rp_dest—IPv4 packets targeting to CMTS.
- ipv6_rp_dest_precedence—The packet whose destination is RP and has non-zero precedence value in IPV6 header.
- ipv6_rp_glean—IPv6 receive adjacency used for IPv4 adjacency resolving.
- ipv6_rp_punt—IPv6 punt adjacency used for IPv4 adjacency resolving.
- ipv6_src_linklocal—IPv6 SRC LinkLocal
- ipv6_src_ver_mac_req—Divert to RP due to zero MD and sid value.

rate Specifies the divert rate in packets/sec. The range is from 1 to 65535. The default value is 4194.

limit Specifies the limit for the number of packets that will be diverted in an initial burst of packets. The range is from 4 to 4194.The default value is 4194.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCJ	This command was introduced.

Usage Guidelines

The **service divert-rate-limit max-rate us-cable** command can be configured when the DDos occurs and the flooding packets have one of the support divert codes.

Note Before you configure the service divert-rate-limit max-rate command, it is recommended to configure the source based DRL first.

Example

The following example shows how to set the rate and limit for the specified divert code:

```
Router(config)# service divert-rate-limit max-rate us-cable fib_rp_glean rate 5000 limit
100
```

Related Commands

Command	Description
show pxf cpu statistics drlmax-rate us-cable	Verifies the drop counters for the DRL max-rate on the upstream cable interface.

service divert-rate-limit max-rate wan

To set per-divert-code rate limit on the WAN interface, use the **service divert-rate-limit max-rate wan** command in global configuration mode. To reset the divert-rate-limit parameters to the default values for all divert-codes, use the no form of this command.

service divert-rate-limit max-rate wan *divert-code* **rate** *rate* **limit** *limit*

Syntax Description

divert-code Configures the divert-rate-limit for any of the following packets:

- fib_rp_dest— IPv4 packets targeting to CMTS.
- fib_rp_glean—FIB glean adjacency used for IPv4 adjacency resolving.
- fib_rp_punt—FIB punt adjacency used for IPv4 adjacency resolving.
- ipv6_rp_dest—IPv4 packets targeting to CMTS.
- ipv6_rp_glean—IPv6 receive adjacency used for IPv4 adjacency resolving.
- ipv6_rp_punt—IPv6 punt adjacency used for IPv4 adjacency resolving.
- mfib_224_0_0_x—The Packet whose destination IP is 224.0.0.x.
- icmpv6—IPv6 ICMP
- mfib_igmp—IGMP protocol packet
- ipv6_nd_na_mcast—IPv6 ND NA (multicast)
- ipv6_nd_na_ucast—IPv6 ND NA (unicast)
- ipv6_nd_ns_mcast—IPv6 ND NS (multicast)
- ipv6_nd_ns_ucast—IPv6 ND NS (unicast)
- ipv6_rp_dest_precedence—The packet whose destination is RP and has non-zero precedence value in IPV6 header.
- ipv6_src_linklocal—IPv6 SRC LinkLocal
- fib_rp_dest_precedence—The packet whose destination is RP and has non-zero precedence value in IP header.

rate Specifies the divert rate in packets/sec. The range is from 1 to 65535. The default value is 4194.

limit Specifies the limit for the number of packets that will be diverted in an initial burst of packets. The range is from 4 to 4194.The default value is 4194.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCH3	This command was introduced.

Release	Modification
12.2(33)SCJ	This command was updated to include more divert codes.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **service divert-rate-limit max-rate wan** command can be configured when the DDos occurs and the flooding packets have one of the support divert codes.

Note Before you configure the service divert-rate-limit max-rate command, it is recommended to configure the source based DRL first.

Example

The following example shows how to set the rate and limit for the specified divert code:

```
Router(config)# service divert-rate-limit max-rate wan fib_rp_glean rate 5000 limit 100
```

Related Commands

Command	Description
show pxf cpu statistics drlmax-rate wan	Verifies the drop counters for the DRL max-rate on the WAN interface.
clear pxf statistics drl max-rate	Clears the DRL max-rate statistics on the WAN interface.

service divert-rate-limit non-ip

To set DRL for WAN-side non-IP packet streams, use the **service divert-rate-limit non-ip** command in global configuration mode. To reset the *rate* and *limit* to the default values for all non-IP divert-codes, use the **no** form of this command. Using **no service divert-rate-limit non-ip** *divert-code* will reset rate and limit to the default values for the specified divert-code.

service divert-rate-limit non-ip *divert-code* **rate** *rate* **limit** *limit*
no service divert-rate-limit non-ip

Syntax Description

divert-code	Specifies the applicable divert code.
rate	Specifies the rate in packets per second. Minimum rate is one packet per second. Maximum rate is 65535 packets per second. For WAN-side non-IP packets, the default rate is 2000 packets per second.
limit	Specifies the number of packets to be diverted in an initial burst of packets. Minimum limit is 4 packets. Maximum limit is 4194 packets. For WAN-non-IP packets, the default limit is 2000 packets.

Command Default

For WAN-side non-IP packets, the default rate is 2000 packets per second and default limit is 2000 packets.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCB	This command was introduced. The **service divert-rate-limit non-ip** *fib-rpf-glean* command is the WAN-side non-IP replacement for the **service divert-rate-limit** *fib-rpf-glean* command.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You can configure a rate and limit for a particular non-IP divert-code, and all packets arriving with that divert-code are sent through a single rate-limiter with the configured rate and limit. but the explanation is fairly straightforward: there is a single rate-limiter for each non-IP divert-code. No attempt is made to uniquely identify the source of the attacking packet stream.

Examples

The following example shows how to set and limit default values for the specified divert code:

```
Router(config)# service divert-rate-limit non-ip fib-rp-glean 10 rate 1 limit 4
```

Related Commands

Command	Description
service divert-rate-limit ip	This command configures DRL rate and limit for WAN-side IP packet streams.

service divert-rate-limit trusted-site

To add entries to the trusted site list, use the **service divert-rate-limit trusted-site** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

service divert-rate-limit trusted-site *ip-address mask-ip-address* **tos** *tos-value* **mask** *tos-mask* [{**global** | **vrf vrf-name**}]
no service divert-rate-limit trusted-site

Syntax Description

ip-address	Specifies the source IP address that should be matched.
mask *ip-address*	The mask to apply to the source IP address of the packet before testing if it matches. There are no restrictions on the mask value.
tos *tos-value*	The ToS value of the trusted site. There are no restrictions on the tos_value. Example: 0xD0
mask *tos-mask*	The mask to apply to the IP ToS value and the trusted-site tos_value before testing if it matches. There are no restrictions on the tos_mask value. Example: 0xF3 **Note** The ToS value can be wild-carded by setting the tos_mask to 0x00
vrf *vrf-name*	The VRF that this trusted site applies to. For the global VRF, use the **global** keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the *tos-mask*. If a non-existent VRF is specified, the table entry is filled, but the information is not written to toaster memory. If the specified VRF is subsequently created, the information is written to toaster at that time.

Command Default

None

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **service divert-rate-limit ip trusted-site** command is used to configure trusted site list that contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list contains a source IP address and mask, IP ToS value and mask, and a VRF. The trusted site list applies only to WAN-IP IPv4 packets. There is a limitation of four trusted sites.

To remove specified entry from the trusted site list, use **no service divert-rate-limit trusted-site** *ip-address* **mask** *ip-address* **tos** *tos-value* **mask** *tos-mask* [**global** | **vrf** *vrf-name*]. If no IP address is specified, the entire trusted site list is cleared.

Examples

The following example shows how to configure trusted site list:

```
Router(config
)# service divert-rate-limit trusted-site 192.0.13.0 255.255.255.0
  tos 0xD0 mask 0xF3 vrf name1
```

Related Commands

Command	Description
service divert-rate-limit non-ip	This command sets and limit default values for the specified divert code.

service divert-rate-limit trusted-site-ipv6

To add IPv6-specific entries to the trusted site list, use the **service divert-rate-limit trusted-site-ipv6** command in the global configuration mode. To remove all entries from the trusted site list, use the **no** form of this command.

service divert-rate-limit trusted-site-ipv6 *ip-address* **traffic-class** *tc_value* **mask** *tc-mask* [{**global** | **vrf** *vrf-name* }]
no service divert-rate-limit trusted-site-ipv6

Syntax Description

ip-address	The source IPv6 address that should be matched.
traffic-class*tc_value*	The 8-bit traffic-class of the trusted site. There are no restrictions on the tc_value. Example: 0xD0
mask *tc-mask*	The mask to apply to the packet traffic-class and the trusted-site *tc_value* before testing if it matches. There are no restrictions on the *tc-mask* value. Example: 0xF3
vrf *vrf-name*	The virtual route forwarding (VRF) instance to which this trusted site is being applied. For the global VRF, use the global keyword. To apply the trusted-site to all VRFs (including the global VRF), hit enter after specifying the *tc-mask*.

Command Default

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCE	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command is used to configure trusted site list that contains an IPv6 source-address/prefix-length, a traffic-class value and mask, and a VRF. There is a limitation of four trusted sites.

Note The **no** form of the command is used to remove all entries from the trusted site list. To remove a specific entry you should specify the matching source IP address. For example: **no service divert-rate-limit trusted-site-ipv6** *ip-address* **traffic-class** *tc_value* **mask***tc-mask* [**global** | **vrf** *vrf-name*].

Examples

The following example shows how to configure IPv6 trusted site list:

```
Router(config)# service divert-rate-limit trusted-site-ipv6 2001:420:3800:800:21F:29FF::1/128
 2001:420:3800:800:21F:29FF::1/128 traffic-class 0x3 mask 0xFF global
Router(config)#
```

Related Commands

Command	Description
show pxf cpu statistics drl us-cable	Displays the number of upstream cable packets that are dropped from the CMTS.
show pxf cpu statistics drl ipv6	Verifies the drop counters for WAN-IPv6 packets.
show pxf cpu statistics drl ipv4	Verifies the drop counters for WAN-IPv4 packets.

service instance

To configure an Ethernet service instance, use the **service instance** command in Layer 2 VPN configuration mode. To disable this configuration, use the **no** form of this command.

service instance *id* *service-type*
no service instance *id* *service-type*

Syntax Description

id	Service instance ID.
service-type	Service type for the instance.

Command Default

None

Command Modes

Layer 2 VPN configuration (config-l2vpn)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You must provision a Multiprotocol Label Switching (MPLS) pseudowire before configuring an Ethernet service instance in Layer 2 VPN configuration mode.

Examples

The following example shows how to configure an Ethernet service instance on a Cisco uBR10012 router:

```
Router # configure terminal
Router(config) # cable l2vpn 001e.6bfb.0f9e customer2
Router(config-l2vpn) # service instance 7000 ethernet
```

Related Commands

Command	Description
cable l2-vpn-service xconnect	Enables the use of Layer 2 tunnels based on an MPLS pseudowire.

service udp-small-servers max-servers no-limit

To enable use of minor servers that use the UDP protocol (such as ToD, echo, chargen, and discard), use the **service udp-small-servers max-servers no-limit** command in global configuration mode. To remove this configuration, use the **no** form of this command.

service udp-small-servers max-servers no-limit
no service udp-small-servers max-servers no-limit

Command Default

DHCP or ToD servers are not configured by default.

Command Modes

Global configuration

Command History

Release	Modification
12.1 EC	Command support introduced on the Cisco CMTS.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Disabling the ping option can speed up address assignment when a large number of modems are trying to connect at the same time. However, disabling the ping option can also result in duplicate IP addresses being assigned if users assign unauthorized static IP addresses to their CPE devices.

Examples

The following example illustrates configuration of this command:

```
Router# configure terminal
Router(config)# service udp-small-servers max-servers no-limit
Router(config)#
```

The following example shows a typical ToD server configuration:

```
service udp-small-servers max-servers no-limit
cable time-server
```

These are the only commands required to enable the ToD server.

Usage Guidelines

The **max-servers no-limit** option allows a large number of cable modems to obtain the ToD server at one time, in the event that a cable or power failure forces many cable modems offline. When the problem has been resolved, the cable modems can quickly reconnect.

Note Do not disable the minor UDP servers if you are also enabling the other DHCP or TFTP servers.

For additional information about DHCP configuration on the Cisco CMTS, refer to the following documents on Cisco.com:

- *Filtering Cable DHCP Lease Queries on the Cisco CMTS*
- *DHCP and Time-of-Day Services on the Cisco CMTS*

Related Commands

Command	Description
cable dhcp-giaddr policy	Sets the DHCP *giaddr* field of DHCP request packets to the primary address for cable modems and the secondary address for CPE devices, allowing the use of separate address pools for the different clients.
cable dhcp-parse option (for uBR series router)	Enables the parsing of certain DHCP options.
cable helper-address	Enables load-balancing of DHCP requests from cable modems and CPE devices by specifying different DHCP servers according to the cable interface or subinterface.
ip dhcp ping packet 0	Instructs the DHCP server to assign an IP address from its pool without first sending an ICMP ping to test whether a client is already currently using that IP address.
ip dhcp relay information option	Configures the DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
ip dhcp smart-relay	Enables the DHCP relay agent on the CMTS to automatically switch a cable modem or CPE device to a secondary DHCP server or address pool if the primary DHCP server does not respond to three successive requests.

service-class

To create a DOCSIS configuration file that specifies the quality-of-service (QoS) service-class options for the CM configuration file, use the **service-class** command in cable config-file configuration mode. To disable the specification, use the **no** form of this command.

service-class {**guaranteed-upstream** *us-bandwidth* | **max-burst** *burst-size* | **max-downstream** *max-dsbandwidth* | **max-upstream** *max-usbandwidth* | **priority** *priority-num* | **privacy**}
no service-class

Syntax Description

class	Specifies service class number. The range is 1 to 16. Default value is 1.
guaranteed-upstream *us-bandwidth*	Specifies the guaranteed upstream bandwidth in kbps. Valid range for *us-bandwidth* is 0 to 100000 kbps. Default value is 0.
max-burst	Specifies the maximum upstream burst size in bytes. Valid range for *burst-size is 0 to 65535. Default value is 0, unlimited burst* length. Recommended value range is 1600 to 1800 bytes. Using a value of 0 or greater than 1800 bytes can cause latency issues for Voice-over-IP. A value of less than 1500 bytes prevents upstream transmission of large Ethernet frames for any modem or CMTS not implementing fragmentation (an optional feature in DOCSIS 1.0).
burst-size **max-downstream** *max-dsbandwidth*	Specifies the downstream bandwidth in kbps. Valid range for *max-dsbandwidth* is 0 to 100000 kbps. Default value is 0.
max-upstream *max-usbandwidth*	Specifies the upstream bandwidth in kbps. Valid range for *max-usbandwidth* is 0 to 100000 kbps. Default value is 0.
priority *priority-num*	Specifies the service class priority. Valid range for *priority-num* is 0 to 7, where 7 is the highest-priority service-class setting.
privacy	Enables baseline privacy interface (BPI).

Command Default

Service-class is not set by default. A CM cannot register on a Cisco CMTS unless at least one parameter in a service class is specified.

Command Modes

Cable config-file (config-file)

Command History

Release	Modification
12.1(2)EC1	This command was introduced.
12.2(4)BC1	This command was integrated into Cisco IOS Release 12.2(4)BC1.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Default values can be used only if **service-class** class is specified. A single configuration file should not contain multiple service-class ID numbers. Thus, all parameters should be set using a single service-class ID. However, different configuration files can reuse the same service-class ID.

Note To enable Baseline Privacy Interface (BPI) operations on the cable command, you must specify both the **service-class privacy** and **privacy** commands for the cable modem's DOCSIS configuration file.

Examples

The following example shows how to specify the **service-class** command for a DOCSIS configuration file:

```
router(config)# cable config-file upgrade.cm
router(config-file)# service-class 1 priority 0
router(config-file)#service-class 1 max-upstream 3247
router(config-file)# service-class 1 max-downstream 10000
router(config-file)# service-class 1 max-burst 1600
router(config-file)# service-class 1 privacy
router(config-file)# privacy

router(config-file)# exit
```

Related Commands

Command	Description
cable config-file	Creates a DOCSIS configuration file and enters configuration file mode.
access-denied	Disables access to the network.
channel-id	Specifies upstream channel ID.
cpe max	Specifies CPE information.
download	Specifies download information for the configuration file.
frequency	Specifies downstream frequency.
option	Specifies vendor-specific information fields and other config-file options.
privacy	Specifies privacy options for baseline privacy images.
snmp manager	Specifies SNMP options.
timestamp	Enables time-stamp generation.

service-class (cmts-tag)

To configure the specified service class name for the CMTS tag, use the **service-class** command in the cmts-tag configuration mode. To remove the configured service class name from the CMTS tag, use the **no** form of this command.

[**exclude**] **service-class** *service-class-name*
no service-class *service-class-name*

Syntax Description

exclude	(Optional) Configures the CMTS tag to exclude the specified service class name.
service-class-name	Service class name with matching rule

Command Default

None

Command Modes

CMTS tag mode (cmts-tag)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to configure the specified service class name for the CMTS tag using the **service-class** command:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# service-class uBR
```

Related Commands

Command	Description
cable load-balance docsis-group	To configure a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	To display real-time configuration, statistical and operational information for load balancing operations on the router.
cable tag	To configure a tag for a DOCSIS load balancing group on the CMTS.

service-class (enforce-rule)

To identify a particular service class for cable modem monitoring in an enforce-rule, use the **service-class (enforce-rule)** command in enforce-rule configuration mode. To remove the service class from the enforce-rule, use the **no** form of this command.

service-class {**enforced** | **registered**} *name*
no service-class {**enforced** | **registered**} *name*

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service-class { {**enforced** *name* [**no-persistence**] | {**registered** *name* } }
no service-class { {**enforced** *name* [**no-persistence**] | {**registered** *name* } }

Syntax Description

enforced	Specifies an enforced service class.
registered	Specifies enforcing of QoS profiles for the registered service class.
name	Specifies the name of the service class.
no-persistence	(Optional) Specifies that the enforced QoS profile should not remain in force when a cable modem reboots.

Command Default

None

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(9a)BC	This command was introduced.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **service-class (enforce-rule)** command allows operators to identify the name of the initial registered service class for a CM in an enforce-rule, and also the name of a new service class to be enforced if the CM violates its registered service parameters.

Examples

The following example shows specification of the enforced service class called “test” in an enforce-rule:

```
Router(enforce-rule)# service-class enforced test
```

The following example shows service class being enforced with **no-persistence** option on a Cisco cBR Series Converged Broadband Routers:

```
Router(enforce-rule)# service-class enforced test1 no-persistence
```

Related Commands

Command	Description
cable qos enforce-rule (for uBR series router)	Creates an enforce-rule to enforce a particular QoS profile for subscriber traffic management and enters enforce-rule configuration mode.
debug cable subscriber-monitoring	Displays enforce-rule debug messages for subscriber traffic management on the Cisco CMTS routers.
duration	Specifies the time period and sample rate to be used for monitoring subscribers.
enabled (enforce-rule)	Activates an enforce-rule and begins subscriber traffic management on a Cisco CMTS router.
monitoring-basics	Specifies the type of monitoring desired for subscriber traffic management on a Cisco CMTS router.
peak-time1	Specifies peak and offpeak monitoring times on a Cisco CMTS router.
qos-profile registered	Specifies the registered QoS profile that should be used for this enforce-rule.
show cable qos enforce-rule	Displays the QoS enforce-rules that are currently defined.
show cable subscriber-usage	Displays subscribers who are violating their registered QoS profiles.

service-descriptor-default

To enable the operator to specify the default values for the service descriptor that will be encoded as part of the serving area table at chassis level, use the **service-descriptor-default** command in the video configuration mode. To disable the feature, use the **no** form of the command.

service-descriptor-default

Command Default

None.

Command Modes

Video configuration mode (config-video)

Command History

Release	Modification
Cisco IOS XE Gibraltar 16.10.1c	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following example shows how to enable the feature:

```
router#configure terminal
router(config)#cable video
router(config-video)#service-descriptor-default
router(config-video-serv-desc)#
```

Related Commands

Command	Description
serving-area	Configures the serving area which enables the set tops to discover VOD content.
cable video	Enters the video configuration mode.

service-distribution-group

To define a service distribution group, use the **service-distribution-group** command in video configuration mode. To delete a service distribution group, use the **no** form of this command.

service-distribution-group *name*
id *id*
no service-distribution-group *name*
id *id*

Syntax Description

service-distribution-group *name*	Specifies the service distribution group name.
id *id*	Specifies the service distribution group identifier.

Command Default

None.

Command Modes

Video configuration (config-video)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command defines a service distribution group.

Examples

The following example shows how to define a service distribution group:

```
Router#configure terminal
Router(config)#cable video
Router(config-video)#service-distribution-group west-region id 1
```

Related Commands

Command	Description
rf-port integrated-cable	Specifies the RF port in a service distribution group.
onid	Specifies the original network identifier in a service distribution group.
psi-interval	Specifies the program specific information interval in a service distribution group.
show cable video service-distribution-group all	Displays the service distribution group information.

service-id

To specify the service ID as part of the service descriptor, use the **service-id** command in the service descriptor configuration mode. To revoke the configuration, use the **no** form of the command.

service-id *value*

Syntax Description

value	Specifies the service ID.

Command Default

None.

Command Modes

Service descriptor configuration mode (config-video-serv-desc)

Command History

Release	Modification
Cisco IOS XE Gibraltar 16.10.1c	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following example shows how to specify the service ID:

```
router#configure terminal
router(config)#cable video
router(config-video)#service-descriptor-default
router(config-video-serv-desc)#service-id 1
```

Related Commands

Command	Description
serving-area	Configures the serving area which enables the set tops to discover VOD content.
service-descriptor-default	Enables the operator to specify the default values for the service descriptor.

service-name

To specify the service name as part of the service descriptor, use the **service-name** command in the service descriptor configuration mode. To revoke the configuration, use the **no** form of the command.

service-name *string*

Syntax Description

string	Specifies the service name.

Command Default

None.

Command Modes

Service descriptor configuration mode (config-video-serv-desc)

Command History

Release	Modification
Cisco IOS XE Gibraltar 16.10.1c	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following example shows how to specify the service name:

```
router#configure terminal
router(config)#cable video
router(config-video)#service-descriptor-default
router(config-video-serv-desc)#service-name test
```

Related Commands

Command	Description
serving-area	Configures the serving area which enables the set tops to discover VOD content.
service-descriptor-default	Enables the operator to specify the default values for the service descriptor.

service-type (service descriptor)

To specify the service type as part of the service descriptor, use the **service-type** command in the service descriptor configuration mode. To revoke the configuration, use the **no** form of the command.

service-type *value*

Syntax Description

value	Specifies the service type.

Command Default

None.

Command Modes

Service descriptor configuration mode (config-video-serv-desc)

Command History

Release	Modification
Cisco IOS XE Gibraltar 16.10.1c	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following example shows how to specify the service type:

```
router#configure terminal
router(config)#cable video
router(config-video)#service-descriptor-default
router(config-video-serv-desc)#service-type 2
```

Related Commands

Command	Description
serving-area	Configures the serving area which enables the set tops to discover VOD content.
service-descriptor-default	Enables the operator to specify the default values for the service descriptor.

service-type (virtual carrier group)

To specify the service type of a virtual carrier group, use the **service-type** command in virtual carrier group configuration mode. To undo the service type assignment, use the **no** form of this command.

service-type {**narrowcast** | **broadcast**}
no service-type {**narrowcast** | **broadcast**}

narrowcast	Specifies video on demand and/or switched digital video service type. These narrowcast service types can share the same virtual carrier group.
broadcast	Specifies the broadcast service type.

Command Default

Narrowcast service type

Command Modes

Virtual carrier group configuration (config-video-vcg)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the service type of a virtual carrier group to be enabled on the linecard.

Examples

The following example shows how to specify the service type of a virtual carrier group:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# virtual-carrier-group vod id 1
Router(config-video-vcg)# service-type broadcast
```

Related Commands

Command	Description
virtual-carrier-group	Defines a virtual carrier group.
virtual-edge-input-ip	Defines a virtual edge input.
encrypt	Enables encryption on the virtual carrier group.
rf-channel	Specifies the virtual RF channels in a virtual carrier group.
show cable video virtual-carrier-group	Displays the virtual carrier group information.

service-type-id (load-balance)

To add a service type ID that is compared against the cable modem provisioned service type ID, to determine an appropriate restricted load balancing group (RLBG), use the **service-type-id** command in the config-lb-group configuration mode. To remove the service type ID, use the **no** form of this command.

service-type-id *string*
no service-type-id *string*

Syntax Description

string	Identifier of the service type that gets added to the load balancing group.

Command Default

No default behavior or values.

Command Modes

DOCSIS load balancing group mode (config-lb-group)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You can use the **service-type-id** command to add a service type ID only to a RLBG.

Examples

The following example shows how to add a service type ID on the CMTS, using the **service-type-id** command.

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)# service-type-id commercial
Router(config-lb-group)# no service-type-id commercial
Router(config-lb-group)#
```

Related Commands

Command	Description
cable load-balance docsis-group	Configures a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	Displays real-time configuration, statistical, and operational information for load balancing operations on the router.

service-type-id (cmts-tag)

To configure the specified service type ID for the CMTS tag, use the **service-type-id** command in the cmts-tag configuration mode. To remove the service type ID, use the **no** form of this command.

[**exclude**] **service-type-id** *service-type-id*
no service-type-id *service-type-id*

Syntax Description

exclude	(Optional) Configures the CMTS tag to exclude the specified service type ID.
service-type-id	Sets a matching rule with the specified service type ID.

Command Default

None

Command Modes

CMTS tag mode (cmts-tag)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to configure the specified service type ID for the CMTS tag using the **service-type-id** command:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# cable tag 1
Router(cmts-tag)# service-type-id commercial
```

Related Commands

Command	Description
cable load-balance docsis-group	To configure a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	To display real-time configuration, statistical and operational information for load balancing operations on the router.
cable tag	To configure a tag for a DOCSIS load balancing group on the CMTS.

serving-area

To configure the serving area which enables the set tops to discover VOD content, use the **serving-area** command in the service distribution group configuration mode. To revoke the configuration, use the **no** form of the command.

serving-area *value*

Syntax Description

value	Specifies the serving-area at SDG level.

Command Default

None.

Command Modes

Service distribution group configuration mode (config-video-sdg)

Command History

Release	Modification
Cisco IOS XE Gibraltar 16.10.1c	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

The following example shows how to configure the serving area:

```
router#configure terminal
router(config)#cable video
router(config-video)#service-distribution-group sdg id 1
router(config-video-sdg)#serving-area 100
```

Related Commands

Command	Description
service-distribution-group	Defines a service distribution group.
show cable video service-distribution-group	Displays the SDG configuration.

session

To configure a table based video session, use the **session** command in session configuration mode. To disable the configuration, use the **no** form of this command.

Note Before configuring the table-based video sessions, you must configure the physical and virtual constructs for Cisco cBR-8. You must also configure the Logical Edge Device (LED), Service Distribution Group (SDG), binding and Virtual Carrier Group (VCG).

session *sess-name* {**input-port** *number* | **bundle-id** *number* }**start-udp-port** *number* **num-sessions-per-qam** *number* **processing-type** {*programdata*}**start-program** *program-num* [{**repeat**}]**jitter** *ms* [{**cbr** | **vbr**}]
no session *sess-name* {**input-port** *number* | **bundle-id** *number* }**start-udp-port** *number* **num-sessions-per-qam** *number* **processing-type** {*programdata*}**start-program** *program-num* [{**repeat**}] **jitter** *ms* [{**cbr** | **vbr**}]

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session *sess-name* **multicast-label** *multicast label* **input-port** *vei-number* **group** *group_ip* **source** *source_ip* **processing-type** {*remappassthrudataremux*}**start-program** *program-num* [{**bit-rate** *bit-rate_number* }][{**jitter** *ms* }][{**cbr** | **vbr**}] **input-program-num** *num* **output-program-num** *num*
no session *sess-name* **multicast-label** *multicast label* **input port** *vei-number* **group** *group_ip* **source** *source_ip* **processing-type** {*remappassthrudataremux*}**start-program** *program-num* [{**bit-rate** *bit-rate_number* }][{**jitter** *ms* }][{**cbr** | **vbr**}] **input-program-num** *num* **output-program-num** *num*

Syntax Description

sess-name	Specifies the session name for the table-based session.
multicast label	Specifies the multicast label name.
input-port *vei-number*	Specifies the virtual edge input port number.
group *group-ip*	Specifies the group name for the table-based session.
input-port *number*	Specifies the input port number for the table-based session.
bundle-id *number*	Specifies the virtual edge input bundle ID.
start-udp-port *number*	Specifies the UDP port number.
num-sessions-per-qam *number*	Specifies the number of sessions per QAM. The valid range is from 1 to 80.

processing-type	Specifies the processing type of session. **program**—Configures video session as program. **data**—Configures video streams that are not dejittered, and remapped. **remap**—Configures video streams that are remapped. **passthru**—Configures video streams that are passthrough. **remux**—Configures video streams that are remultiplexed. This processing type allows you to specify a program in a multi-program transport stream (MPTS) input session, renumber it, and send it to an output session.
start-program *program-num*	Specifies the starting program number. The valid range is from 1 to 65535.
bit-rate *bit-rate-number*	Specified the bits per second.
jitter *ms*	Specifies the jitter value in milliseconds. The valid range is from 10 to 200.
input-program-num *num*	Specifies the input program number. This is applicable only for remux sessions. The allowed range of program numbers is 1–65535.
output-program-num *num*	Specifies the output program number. This is applicable for remap and remux sessions. The allowed range of program numbers is 1–65535.

Command Default

None

Command Modes

Session configuration (config-video-tb-vcg-sess)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.18.0SP	This command was modified on the Cisco cBR Series Converged Broadband Routers. .
IOS-XE 16.8.1	The **remux** and the **input-program-num** keywords were added.

Usage Guidelines

This command configures a table based video session.

Examples

The following example shows how to configure the virtual carrier group and service distribution group for replication:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# table-based
Router(config-video-tb)# vcg pme_tbv
Router(config-video-tb-vcg)# rf-channel 20-22
Router(config-video-tb-vcg-sess)# session bago_tbv input-port 10 start-udp-port 1
num-sessions-per-qam 2 processing-type remap start-program 1 jitter 100 cbr
```

The following example shows how to configure the virtual carrier group with passthru processing type:

```
Router#configure terminal
Router(config)#cable video
Router(config-video)#table-based
Router(config-video-tb)# multicast-label a2 group 232.5.6.7 source 175.2.5.6
Router(config-video-tb)#multicast-label exampleLabel group 232.2.1.6 source 175.6.1.13
source2 175.6.1.12 source3 180.1.1.1 source4 175.6.1.14
Router(config-video-tb)#vcg VCG_PME4
Router(config-video-tb-VCG_PME4)#rf-channel 24
Router(config-video-tb-VCG_PME4-sess)#session SESS_PME4 group 232.5.6.15 source 175.2.6.7
processing-type passthru
```

The following example shows how to configure a session with remux processing type:

```
Router# session remux1 group 209.165.200.225 source 192.0.2.1 processing-type remux
input-program-num 1 output-program-num 1
```

The following example shows how to see the remux sessions with input and output program numbers:

```
Router#sh cable video session log id 31
Total Sessions = 80

Session  Output Frequency  Streaming Sess Session Source       UDP  Input   Output  Input
     Output Input    Output   Encrypt  Encrypt Low PMV Session
Id       Port   Hz         Type      Type Ucast Dest IP        Port Program Program State
     State  Bitrate  Bitrate  Type     Status  Lat NUM Name
                                     /Mcast IP (S,G)

-----------------------------------------------------------------------------------------------
32505897 54     825000000  Remux     SSM  192.0.2.1,234.1.1.1  0    1       1       ACTIVE-PSI
 ON     65088810 65684765 CLEAR    -       N   -   remux1.9.5015
32505898 54     825000000  Remux     SSM  192.0.2.1,234.1.1.1  0    2       2       ACTIVE-PSI
 ON     65088810 65684765 CLEAR    -       N   -   remux2.9.5015
32505899 54     825000000  Remux     SSM  192.0.2.1,234.1.1.1  0    3       3       ACTIVE-PSI
 ON     65088810 65684765 CLEAR    -       N   -   remux3.9.5015
32505900 54     825000000  Remux     SSM  192.0.2.1,234.1.1.1  0    4       4       ACTIVE-PSI
 ON     65088810 65684765 CLEAR    -       N   -   remux4.9.5015
32505901 54     825000000  Remux     SSM  192.0.2.1,234.1.1.1  0    5       5       ACTIVE-PSI
 ON     65088810 65684765 CLEAR    -       N   -   remux5.9.5015
```

Related Commands

Command	Description
virtual-carrier-group	Defines a virtual carrier group.
service-distribution-group	Defines a service distribution group.
rf-port integrated-cable	Specifies the RF ports in a service distribution group.
rf-channel	Specifies the virtual RF channels in a virtual carrier group.
bind-vcg	Binds a set of virtual RF-channels defined in the virtual carrier group to the physical port in the service distribution group.

session name multicast-label

The Cisco cBR Series Converged Broadband Routers supported two clock recovery modes: VBR and CBR. Both VBR and CBR modes use one phase-locked loop (PLL) to recover the program clock, using all the PCR packet identifiers (PIDs) found in content. Hence, for MPTS sessions with a large number of programs, the PCRs may have different clock frequencies and be of poor quality. This lead to excessive overdue drops and bad output video quality.

The *Clock Recovery Mechanism* is a new third clock recovery mode, supported from Cisco IOS XE Gibraltar 17.3.1x, and can handle this type of content with better results. The Clock Recovery Mechanism uses one phase-locked loop (PLL) to recover the program clock, using only one PCR PID as the primary. All the other PCR PIDs are subordinates and are re-timed using the clock recovered from the primary PCR PID. The output will be good if the primary PCR is of good quality.

session *name* **multicast-label** *label* **processing-type** *type* **primary-subordinate** [{ **pcr-pid <pid>** }]

Syntax Description

Parameter	Description
name	Specifies the session name
label	Specifies the multicast label name
type	Specifies the processing type of session.
pcr-pid <pid>	This is an optional parameter, and allows you to select a desired PCR-pid to be used for the primary PCR PID

Command Default

None

Command Modes

Service distribution group configuration mode (config-video-sdg)

Command History

Release	Modification
Cisco IOS XE Gibraltar 17.3.1x	The Clock Recovery Mechanism command was introduced on the Cisco cBR Series Converged Broadband Routers.

The keyword *primary-subordinate* selects primary-subordinate Clock Recovery Mechanism for the session. One of the PCR PIDs is selected to serve as the primary PID. The selected PID is the first PCR PID found in the content, or first one found after a buffer overflow or underflow handling. The Clock Recovery Mechanism is available for both unicast and multicast sessions, for session of processing types remap, passhthru and remux. They are not available for data-piping sessions.

Note If the primary PCR PID is not configured, or is absent in the content, one of the PCR PIDs is selected to serve as the primary PID. The selected PID is the first PCR PID found in the content, or first one found after a buffer overflow or underflow handling.

Usage Guidelines

To recover the overdue drops, you can configure the Clock Recovery Mechanism.

Examples

The following example shows how to configure the Clock Recovery Mechanism under cable video configuration:

```
Router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# cable video
Router(config-video)# table-based
Router(config-video-tb)# $source3 175.10.3.2 source4 175.10.4.2
Router(config-video-tb)#    vcg v2
Router(config-video-tb-vcg)#      rf-channel 68
Router(config-video-tb-vcg-sess)#$ session check input-port 1 start-udp-port 1523
processing-type remux input-program-num 1 output-program-num 1 primary-subordinate pcr-pid
 50
Router(config-video-tb-vcg-sess)# exit
Router(config-video-tb-vcg)# exit
Router(config-video-tb)# exit
Router(config-video)# exit
Router(config)#
```

session-range

To identify the multicast QoS group session range, use the **session-range** command in multicast QoS configuration mode. To disable the QoS group session range, use the **no** form of this command.

session-range *ip-address* *ip-mask*
no **session-range** *ip-address* *ip-mask*

Syntax Description

ip-address	Specifies the IP address of the multicast QoS group.
ip-mask	Specifies the IP mask of the multicast QoS group.

Command Default

A session range IP address and IP mask are not defined for a specific multicast QoS group.

Command Modes

Multicast QoS configuration (config-mqos)

Command History

Release	Modification
12.2(33)SCA	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **session-range** command to configure the session range to specify the number of multicast sessions to be admitted on a particular service flow. CMTS does not admit new sessions (no forwarding) if the current number of sessions has reached the defined limit, and waits until a session ends to free up a slot for new sessions. You can configure multiple session ranges.

Examples

The following example defines a session range IP address and IP mask using the **session-range** command:

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# session-range 224.10.10.01 255.255.255.254
```

Related Commands

Command	Description
cable multicast qos group	Specifies and configures a cable multicast QoS group.
show interface bundle multicast-sessions	Displays multicast session information for a specific virtual cable bundle.
show interface cable multicast-sessions	Displays multicast session information for a specific cable interface.

set clock

To set the system clock on the Cisco CMTS, use the **set clock** command in global configuration mode.

set clock *time-date*

Syntax Description

time-date	Time and date for which to set the clock on the Cisco CMTS.

Command Default

Time-of-Day, DHCP, and TFTP server configuration not defined on the Cisco CMTS by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(4)XI	This feature was introduced for the Cisco uBR7200 series routers.
12.1(5)EC	This feature was supported on the Cisco uBR7100 series routers.
12.2(4)BC1	This feature was supported on the Release 12.2 BC train for all Cisco CMTS platforms.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

To supply an accurate clock, the system clock on the Cisco CMTS should be configured for the correct time, either by using the **set clock** command or by configuring the Cisco CMTS to act as a Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) client.

For proper operation of the DOCSIS network, especially a DOCSIS 1.1 network using BPI+ encryption and authentication, the system clock on the Cisco CMTS must be set accurately. You can achieve this by manually using the **set clock** command, or by configuring the CMTS to use either the Network Time Protocol (NTP) or the Simple Network Time Protocol (SNTP).

For additional information about the **set clock** command, refer to the following documents on Cisco.com:

- http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_services.html#wp1051747 Time-of-Day Server for the Cisco CMTS
- http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_services.html DHCP, ToD, and TFTP Services for the Cisco Cable Modem Termination System

Related Commands

Command	Description
cable dhcp-giaddr policy	Sets the DHCP *giaddr* field of DHCP request packets to the primary address for cable modems and the secondary address for CPE devices, allowing the use of separate address pools for the different clients.
cable dhcp-parse option	Enables the parsing of certain DHCP options.
cable helper-address	Enables load-balancing of DHCP requests from cable modems and CPE devices by specifying different DHCP servers according to the cable interface or subinterface.

Command	Description
ip dhcp ping packet 0	Instructs the DHCP server to assign an IP address from its pool without first sending an ICMP ping to test whether a client is already currently using that IP address.
ip dhcp relay information option	Configures the DHCP server to validate the relay agent information option in forwarded BOOTREPLY messages.
ip dhcp smart-relay	Enables the DHCP relay agent on the CMTS to automatically switch a cable modem or CPE device to a secondary DHCP server or address pool if the primary DHCP server does not respond to three successive requests.