



Introduction

This document contains information about downloading and installing Cisco IOS Release 12.2(33)SCB. It also provides new and changed information, hardware support, limitations and restrictions, and caveats for Cisco IOS Release 12.2(33)SCB.

For software caveats that apply to the Cisco IOS Release 12.2(33)SCB on the Cisco uBR10012 routers, see the corresponding release notes for Cisco uBR10012 Routers.

We recommend that you view the field notices for this release to see if your software or hardware platforms are affected. If you have an account on Cisco.com, you can find field notices at http://www.cisco.com/en/US/customer/support/tsd_products_field_notice_summary.html.

If you do not have a Cisco.com login account, you can find field notices at http://www.cisco.com/en/US/support/tsd_products_field_notice_summary.html.

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Inheritance Information

This section describes the related Cisco IOS software releases that are part of the Cisco IOS Release 12.2SC train.

SCA-based releases

- Prior Cisco IOS 12.2SCA releases
- Cisco IOS Release 12.3(21)BC
- Cisco IOS Release 12.2(31)SB (which is based on Cisco IOS Release 12.2(25)S and includes many features from Cisco IOS Release 12.2T)
- Cisco IOS Release 12.2(33)SRC

SCB-based releases

- Prior Cisco IOS 12.2SCA releases
- Cisco IOS Release 12.3(21)BC
- Cisco IOS Release 12.3(23)BC
- Cisco IOS Release 12.2(33)SB
- Cisco IOS Release 12.2(33)SRC

System Requirements

These sections describe the system requirements for Cisco IOS Release 12.2(33)SCB:

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Memory Requirements

This section describes the memory requirements for Cisco IOS Release 12.2(33)SCB.

[Table 1](#) displays the memory recommendations for the Cisco uBR7200 series universal broadband routers with Cisco IOS Release 12.2SC feature sets. Cisco uBR7200 series routers are only available with 48 MB or 128 MB of flash memory on the I/O Controller cards. The UBR7200-NPE-G1 and NPE-G2 use FlashDisks only.

**Note**

FlashDisks, an alternative to linear flash memory, are flash memory-based devices that can be used as file storage media in the PCMCIA card slots of the I/O controllers. Each I/O Controller has two PCMCIA slots and can be configured with up to 256 MB of FlashDisk memory.

Table 1 Memory Recommendations for the Cisco uBR7200 Series Routers

Feature Set	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Two-Way Data/VoIP Images (NPE-G1 and NPE-G2)				
DOCSIS 2-Way 3DES for Cisco NPE-G1	ubr7200-jk9su2	48 MB	512 MB DRAM	RAM
DOCSIS 2-Way 3DES for Cisco NPE-G2	ubr7200p-jk9su2	128 MB	1 GB DRAM	RAM
Boot Image				
UBR7200 Boot Image	ubr7200-kboot-mz	None	None	—
UBR7200 NPE-G2 Boot Image	ubr7200p-kboot-mz	None	None	—

The image subset legend for [Table 1](#) is as follows:

- j—IP routing, MPLS-VPN support, and non-cable interface bridging, including Network Address Translation (NAT)
- k9—AES/DES level of encryption. Greater than 64-bit encryption (on 12.2 and up)
- s—“Plus” features: NAT and Inter-Switch Link (ISL)

Hardware Supported

The following sections list the hardware supported on various Cisco IOS Releases:

- [Platforms Supported, page 1-3](#)
- [Cable Interface Line Cards Supported, page 1-3](#)
- [Cisco uBR7200 Series Universal Broadband Router Port Adapters Supported, page 1-4](#)

Platforms Supported

[Table 2](#) provides information about the CMTS router platforms and processors supported in Cisco IOS Release 12.2(33)SCB.

Table 2 *Platforms Supported in Cisco IOS Release 12.2(33)SCB*

Platform	Processor Engine	Minimum Cisco IOS Release
Cisco uBR7246VXR Universal Broadband Router	NPE-G1 and NPE-G2	Cisco IOS Release 12.2(33)SCA
Cisco uBR7225VXR Universal Broadband Router	NPE-G1 only	Cisco IOS Release 12.2(33)SCA
	NPE-G1 and NPE-G2	Cisco IOS Release 12.2(33)SCB and later

Cable Interface Line Cards Supported

[Table 3](#) provides information about the cable interface line cards supported in Cisco IOS Release 12.2(33)SCB.

Table 3 *Cable Interface Line Cards Supported in Cisco IOS Release 12.2(33)SCB*

Platform	Supported Cable Interface Line Cards
Cisco uBR7246VXR universal broadband router	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> • Cisco uBR-MC28U/X—maximum 4 • Cisco uBR-MC16U/X—maximum 4
Cisco uBR7225VXR universal broadband router	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> • Cisco uBR-E-28U—maximum 2 • Cisco uBR-E-16U—maximum 2 • Cisco uBR-MC28U/X—maximum 2 • Cisco uBR-MC16U/X—maximum 2

OIR of Cable Interface Line Cards on the Cisco uBR7200 Universal Broadband Router

The Cisco uBR7200 series universal broadband routers support online insertion and removal (OIR) or “hot swapping” of cable interface line cards only when exchanging cable interface line cards of the exact type. For example, exchanging a Cisco uBR-MC28U card for another Cisco uBR-MC28U line card. Under these conditions, no reload of the router is required.



Caution

When you perform OIR of different types of cable interface line cards (for example, a Cisco uBR-MC16U line card replaced by a Cisco uBR-MC16X line card, Cisco uBR-MC16U line card replaced by a Cisco uBR-MC28U line card, or Cisco uBR-MC28U line card replaced by a Cisco uBR-MC88V cable interface line card), you might not only have to reconfigure the interfaces, but also reload the router (recommended).

Cisco uBR7200 Series Universal Broadband Router Port Adapters Supported

Table 4 provides information about the maximum number of port adapters (PA) supported on the Cisco uBR7200 series universal broadband routers:

Table 4 Number of Port Adapters Supported in Cisco uBR7200 Series Universal Broadband Routers

Platform	Port Adapters—Maximum Number	Minimum Cisco IOS Release
Cisco uBR7246VXR universal broadband router	See Table 5; maximum 2	Cisco IOS Release 12.2(33)SCA

Table 5 provides information about the port adapters supported by the Cisco uBR7200 series universal broadband routers in Cisco IOS Release 12.2SC and uses the following conventions:

- Yes—The port adapter is supported in the software image.
- No—The port adapter is not supported in the software image.
- In—The “Release” column indicates the release of the Cisco IOS Release 12.2SB when the port adapter was introduced. If a cell in this column contains an em dash (—), it indicates that:
 - Support for the port adapter was inherited from Cisco IOS Release 12.2 or from another release.
 - Support for the port adapter was included in the initial base release of Cisco IOS Release 12.2SC.

Table 5 Port Adapters Supported for the Cisco uBR7200 Series Universal Broadband Routers

Cisco Product Number ¹	Adapter Description	Cisco IOS Release	Cisco uBR7246VXR
ATM Port Adapters			
PA-A3-OC3MM	1-port ATM Enhanced OC3c/STM1 multimode	—	No
PA-A3-OC3SMI	1-port ATM Enhanced OC3c/STM1 single mode (IR)	—	No
PA-A3-OC3SML	1-port ATM Enhanced OC3c/STM1 single mode (LR)	—	No
PA-A3-OC12MM	1-port ATM Enhanced OC12/STM4 multimode	—	No
PA-A3-OC12SMI	1-port ATM Enhanced OC12/STM4 single mode (IR)	—	No
PA-A3-E3	1-port ATM Enhanced E3	—	No

Table 5 Port Adapters Supported for the Cisco uBR7200 Series Universal Broadband Routers (continued)

Cisco Product Number ¹	Adapter Description	Cisco IOS Release	Cisco uBR7246VXR
PA-A3-T3	1-port ATM Enhanced DS3	—	No
PA-A3-8E1IMA	8-port ATM Inverse Mux E1, 120 ohms	—	No
PA-A3-8T1IMA	8-port ATM Inverse Mux T1	—	No
PA-A6-OC3MM	1-port ATM OC-3c/STM-1 multimode, enhanced	12.2(28)SB	Yes
PA-A6-OC3SML	1-port ATM OC-3c/STM-1 single-mode (LR), enhanced	12.2(28)SB	Yes
PA-A6-E3	1-port ATM E3, enhanced	12.2(28)SB	No
PA-A6-T3	1-port ATM DS3, enhanced	12.2(28)SB	Yes
Fast Ethernet/Gigabit Ethernet Port Adapters			
PA-4E	4-port Ethernet 10BASE-T	—	No
PA-2FE-FX	2-port Fast Ethernet 100BASE-FX	—	Yes
PA-2FE-TX	2-port Fast Ethernet 100BASE-TX	—	Yes
PA-GE	1-port Gigabit Ethernet	—	Yes
High-Speed Serial Port Adapters			
PA-2H	2-port High-Speed Serial Interface (HSSI)	—	No
Multichannel Serial Port Adapters			
PA-MC-T3-EC	1-port multichannel T3 enhanced capability	—	Yes
PA-MC-T3	1-port multichannel T3	—	No
PA-MC-E3	1-port multichannel E3	—	No
PA-MC-2T3+	2-port multichannel T3	—	No
PA-MC-2E1/120	2-port multichannel E1, G.703 120-ohm interface	—	No
PA-MC-4T1	4-port multichannel T1, integrated CSU/DSUs	—	No
PA-MC-8TE1+	8-port multichannel T1/E1 8PRI	—	No
PA-MC-STM-1MM	1-port multichannel STM-1 multimode	—	No
PA-MC-STM-1SMI	1-port multichannel STM-1 single mode	—	No
PA-4B-U	4-port BRI, U Interface	—	No
PA-8B-S/T	8-port BRI, S/T Interface	—	No
SONET Port Adapters			
PA-POS-OC3SMI	1-port Packet over SONET OC3c/STM1 single mode (IR)	—	No
PA-POS-1OC3	1-port OC-3/STM-1 POS (with APS)	12.2(28)SB6	Yes
PA-POS-2OC3	2-port OC-3/STM-1 POS (with APS)	—	Yes
T1/E1 Port Adapters			
PA-4T+	4-port Serial, Enhanced	—	Yes
PA-8T-V35	8-port Serial, V.35	—	No
T3/E3 Port Adapters			

Table 5 Port Adapters Supported for the Cisco uBR7200 Series Universal Broadband Routers (continued)

Cisco Product Number ¹	Adapter Description	Cisco IOS Release	Cisco uBR7246VXR
PA-T3+	1-port T3 Serial, Enhanced	12.2(x)SB	Yes
PA-2T3+	2-port T3 Serial, Enhanced	12.2(x)SB	Yes
PA-E3	1-port E3 Serial, E3 DSUs	—	No
PA-2E3	2-port E3 Serial, E3 DSUs	12.2(x)SB	Yes

1. For a spare product number, append an equal sign (=) to the product number. If a product number is listed as a spare product in the table, that is, with an equal sign (=), it means that the product is only available as a spare product.

Verifying the Software Version

To verify the version of the Cisco IOS software running on your Cisco universal broadband router, log in to the router and enter the **show version EXEC** command:

```
Router# show version
```

```
Cisco IOS Software, 7200 Software (UBR7200P-JK9SU2-M), Version 12.2(32.7.9)SCB
EXPERIMENTAL IMAGE ENGINEERING C10K_WEEKLY BUILD, synced to
MAYFLOWER_BASE_FOR_V122_33_SB_THROTTLE
Copyright (c) 1986-2009 by Cisco Systems, Inc.
```

```
ROM: System Bootstrap, Version 12.4(12.2r)T, RELEASE SOFTWARE (fc1)
```

Upgrading to a New Software Release

For information about selecting a new Cisco IOS software release, see "How to Choose a Cisco IOS Software Release" at the following location:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1834/products_tech_note09186a00800fb9d9.shtml

For information about upgrading the Cisco universal broadband routers, see the *Software Installation and Upgrade Procedures* document at the following location:

http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a0080094c07.shtml

For Cisco IOS upgrade ordering instructions, see the document at the following location:

http://www.cisco.com/warp/public/cc/pd/iosw/prodlit/957_pp.htm

Upgrading to Cisco IOS Release 12.2(33)SCA on a Cisco uBR7246VXR Universal Broadband Router

A cold start of the router is recommended for an upgrade to Cisco IOS Release 12.2(33)SCA from a different release train on a Cisco uBR7246VXR router, such as Cisco IOS Release 12.3(23)BC or other Cisco IOS BC releases.

Feature Support

Cisco IOS software is packaged in feature sets that consist of software images that support specific platforms. The feature sets available for a specific platform depend on which Cisco IOS software images are included in a release. Each feature set contains a specific set of Cisco IOS features.



Caution

Cisco IOS images with strong encryption (including, but not limited to 168-bit [3DES] data encryption feature sets) are subject to U.S. government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay because of U.S. government regulations. When applicable, the purchaser or user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Cisco CMTS User Documentation References for Cisco IOS Release 12.2SC

The table below provides information about important user documents in Cisco IOS Release 12.2SC.

Table 1-6 Important User Documents in Cisco IOS Release 12.2SC

Guide	Description
Documentation Roadmap	Describes a set of Cisco CMTS documents and contains links to the referenced documents. Go to the following link to access this document: http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/roadmap/7200rdmp.html
Command Reference	Provides information about the software commands used to configure a Cisco CMTS. Includes command syntax, default value, value range, command mode, usage guidelines, and examples. Go to the following link to access this document: http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html
Design Guides	Describes how to plan, install, and configure a Cisco CMTS. Contains information about the supported technologies, interfaces and protocols and can also contain special installation considerations, network diagrams, example applications, system design, and environmental recommendations. Go to the following link to access this document set: http://www.cisco.com/en/US/products/hw/cable/ps2217/tsd_products_support_design_technotes_list.html

Guide	Description
Install and Upgrade Guides	<p>Provides step-by-step instructions for installing or upgrading a Cisco CMTS. Also includes line card installation guides, shipping documents, safety information, and quick-start guides for experienced users.</p> <p>Go to the following link to access this document set: http://www.cisco.com/en/US/products/hw/cable/ps2217/prod_installation_guides_list.html</p> <p>Important guides in this section are:</p> <ul style="list-style-type: none"> • Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide • Upgrading to the Cisco uBR7246 VXR Universal Broadband Router
Configuration Guides	<p>Contains detailed, step-by-step instructions for configuring a Cisco CMTS, including software feature guides, configuration examples, network diagrams, and technical concepts.</p> <p>Go to the following link to access this document:</p> <ul style="list-style-type: none"> • Cisco IOS CMTS Cable Software Configuration Guide, Release 12.2SC
Error and System Messages	<p>Lists error and system messages for a Cisco CMTS, including any recommended user action for each message.</p> <p>Go to the following link to access this document: http://www.cisco.com/en/US/docs/cable/cmts/system/message/uberrmes.html</p>
Troubleshooting Guides	<p>Provides problem-solving techniques for a Cisco CMTS, including methods to identify problems based on symptoms and recommended actions for resolution.</p> <p>Go to the following link to access this document set: http://www.cisco.com/en/US/products/hw/cable/ps2217/prod_troubleshooting_guides_list.html</p>

Cisco Feature Navigator

The Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). Under the release section, you can compare Cisco IOS software releases side-by-side to display both the features unique to each software release and the features that the releases have in common.

To access the Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check verifies that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password is e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<https://tools.cisco.com/RPF/register/register.do>

The Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

For frequently asked questions about the Cisco Feature Navigator, see the FAQs at the following URL:

<http://www.cisco.com/support/FeatureNav/FNFAQ.html>

Determining Which Software Images Support a Specific Feature

To identify the software images (feature sets) in Cisco IOS Release 12.2(33)SC that support a specific feature:

-
- Step 1** Go to the Cisco Feature Navigator home page. Enter your Cisco.com login.
 - Step 2** Click **Search by Feature**.
 - Step 3** To find a feature, use either **Filter by full or partial feature name** or search for available features in alphabetical order. Either a list of features that match the search criteria or a list of features that begin with the number or letter selected from the ordered list is displayed in the text box.
 - Step 4** Select a feature from the Available Features pane, and click **Add** to add a feature to the Selected Features pane.



Note To learn more about a feature in the list, click **Show Descriptions**.

Repeat this step to add additional features. A maximum of 20 features can be chosen for a single search.

- Step 5** Click **Continue** when you are finished selecting features.
 - Step 6** From the Major Release drop-down menu, choose **12.2SC**.
 - Step 7** From the Release drop-down menu, choose the appropriate maintenance release.
 - Step 8** From the Platform Family drop-down menu, select the appropriate hardware platform. The **Search Results** table lists all the software images (feature sets) that support the selected feature.
-

Determining Which Features Are Supported in a Specific Software Image

To determine the features supported in a specific software image (feature set) in Cisco IOS Release 12.2(33)SC:

-
- Step 1** Go to the Cisco Feature Navigator home page. Enter your Cisco.com login.
 - Step 2** Click **Compare Images**.
 - Step 3** From the Software drop-down menu in the **Select First Image Parameters** pane, choose **IOS**.
 - Step 4** From the Major Release drop-down menu, choose **12.2SC**.
 - Step 5** From the Release Number drop-down menu, choose the appropriate maintenance release.
 - Step 6** From the Platform Family drop-down menu, choose the appropriate hardware platform.
 - Step 7** From the Feature Set drop-down menu, choose the appropriate feature set. The **Search Results** table lists all the features that are supported by the selected feature set (software image).
-

New and Changed Information

The following sections list the new and modified hardware and software features supported on the Cisco uBR7200 routers in Cisco IOS Release 12.2(33)SCB:

- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB11](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB10](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB9](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB8](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB7](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB6](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB5](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB4](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB3](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB2](#), page 1-11
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCB1](#), page 1-12
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- [New Software Features in Cisco IOS Release 12.2\(33\)SCB11](#), page 1-12
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB11](#), page 1-12
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB10](#), page 1-12
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- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB7](#), page 1-13
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB6](#), page 1-13
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB6](#), page 1-13
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB5](#), page 1-14
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB5](#), page 1-14
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB4](#), page 1-14
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB4](#), page 1-15
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB3](#), page 1-15
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB3](#), page 1-15
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB2](#), page 1-15
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB2](#), page 1-15
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB1](#), page 1-15
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB1](#), page 1-16
- [New Software Features in Cisco IOS Release 12.2\(33\)SCB](#), page 1-16
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCB](#), page 1-24

New Hardware Features in Cisco IOS Release 12.2(33)SCB11

There are no new hardware features in Cisco IOS Release 12.2(33)SCB11.

New Hardware Features in Cisco IOS Release 12.2(33)SCB10

There are no new hardware features in Cisco IOS Release 12.2(33)SCB10.

New Hardware Features in Cisco IOS Release 12.2(33)SCB9

There are no new hardware features in Cisco IOS Release 12.2(33)SCB9.

New Hardware Features in Cisco IOS Release 12.2(33)SCB8

There are no new hardware features in Cisco IOS Release 12.2(33)SCB8.

New Hardware Features in Cisco IOS Release 12.2(33)SCB7

There are no new hardware features in Cisco IOS Release 12.2(33)SCB7.

New Hardware Features in Cisco IOS Release 12.2(33)SCB6

There are no new hardware features in Cisco IOS Release 12.2(33)SCB6.

New Hardware Features in Cisco IOS Release 12.2(33)SCB5

There are no new hardware features in Cisco IOS Release 12.2(33)SCB5.

New Hardware Features in Cisco IOS Release 12.2(33)SCB4

There are no new hardware features in Cisco IOS Release 12.2(33)SCB4.

New Hardware Features in Cisco IOS Release 12.2(33)SCB3

There are no new hardware features in Cisco IOS Release 12.2(33)SCB3.

New Hardware Features in Cisco IOS Release 12.2(33)SCB2

There are no new hardware features in Cisco IOS Release 12.2(33)SCB2.

New Hardware Features in Cisco IOS Release 12.2(33)SCB1

There are no new hardware features in Cisco IOS Release 12.2(33)SCB1.

New Hardware Features in Cisco IOS Release 12.2(33)SCB

This section describes the hardware feature supported in Cisco IOS 12.2(33)SCB.

NPE-G2 Processor on the Cisco uBR7225VXR Router

See

<http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/ubr7225vvr/installation/guide/ub7225prod.html#wp1026827> for more information.

New Software Features in Cisco IOS Release 12.2(33)SCB11

There are no new software features in Cisco IOS Release 12.2(33)SCB11.

Modified Software Features in Cisco IOS Release 12.2(33)SCB11

There are no modified software features in Cisco IOS Release 12.2(33)SCB11.

New Software Features in Cisco IOS Release 12.2(33)SCB10

This section lists the new features in Cisco IOS Release 12.2(33)SCB10. Some features may be new to Cisco IOS Release 12.2(33)SCB10 but were released in earlier Cisco IOS software releases.

IPv6 Support on Multiple Subinterfaces

Starting with Cisco IOS Release 12.2(33)SCB10, IPv6 commands are supported on multiple CMTS bundle subinterfaces.

For more details on this feature, refer to the *IPv6 on Cable* feature document at the following location:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_ipv6.html#wp1077229

Suppressing Downstream and Upstream Peak Rate TLVs for pre DOCSIS 3.0 Cable Modems

The DOCSIS 3.0 upstream (US) peak rate TLV 24.27 and downstream (DS) peak rate TLV 25.27 are enabled on the Cisco CMTS through the **cable service class** command or the CM configuration file. The DOCSIS 1.x and DOCSIS 2.0 CMs do not support these TLVs. Ideally, if a DOCSIS 1.x or DOCSIS 2.0 CM receives peak rate TLVs during registration, it should ignore these TLVs and proceed with the registration. However there are a few old non-compliant pre DOCSIS 3.0 CMs, which may fail to come online when peak-rate TLVs are received in the registration response from the Cisco CMTS. To overcome this, the Cisco CMTS has introduced this feature which allows you to suppress sending of DOCSIS 3.0 peak rate TLVs to the pre DOCSIS 3.0 CMs.

The following command was introduced:

- **cable service attribute withhold-TLV**

For more details on this feature, refer to the *DOCSIS 1.1 for the Cisco CMTS Routers* at the following location:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_docsis11.html

Modified Software Features in Cisco IOS Release 12.2(33)SCB10

There are no modified software features in Cisco IOS Release 12.2(33)SCB10.

New Software Features in Cisco IOS Release 12.2(33)SCB9

There are no new software features in Cisco IOS Release 12.2(33)SCB9.

Modified Software Features in Cisco IOS Release 12.2(33)SCB9

There are no modified software features in Cisco IOS Release 12.2(33)SCB9.

New Software Features in Cisco IOS Release 12.2(33)SCB8

There are no new software features in Cisco IOS Release 12.2(33)SCB8.

Modified Software Features in Cisco IOS Release 12.2(33)SCB8

There are no modified software features in Cisco IOS Release 12.2(33)SCB8.

New Software Features in Cisco IOS Release 12.2(33)SCB7

There are no new software features in Cisco IOS Release 12.2(33)SCB7.

Modified Software Features in Cisco IOS Release 12.2(33)SCB7

There are no modified software features in Cisco IOS Release 12.2(33)SCB7.

New Software Features in Cisco IOS Release 12.2(33)SCB6

There are no new software features in Cisco IOS Release 12.2(33)SCB6.

Modified Software Features in Cisco IOS Release 12.2(33)SCB6

There are no modified software features in Cisco IOS Release 12.2(33)SCB6.

New Software Features in Cisco IOS Release 12.2(33)SCB5

There are no new features supported in Cisco IOS Release 12.2(33)SCB5.

Modified Software Features in Cisco IOS Release 12.2(33)SCB5

There are no modified features supported in Cisco IOS Release 12.2(33)SCB5.

New Software Features in Cisco IOS Release 12.2(33)SCB4

This section describes the new cable software features in Cisco IOS Release 12.2(33)SCB4. Some features may be new to Cisco IOS Release 12.2(33)SCB4 but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.2(33)SCB4. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

The **show interface cable dsg downstream dcd** command output is modified to display the DOCSIS Set-top Gateway (DSG) Downstream Channel Descriptor (DCD) messages for all interfaces in the MAC domain.

For more information, refer

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_18_show_d_to_show_i.html#wp1148747

Direct Load for Cable Modems

A new command, **cable upstream equalization-error-recovery**, is introduced to enable the CMTS to send type, length, value (TLV) Type 9 in the DOCSIS ranging response (RNG-RSP) MAC management messages. The TLV Type 9 helps CMs to come online if the TLV Type 4 convolved method causes CMs to go offline.

For details about this command, see the Cisco IOS CMTS Cable Command Reference at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_10_cable_u_to_cable_w.html

Adding DSG Tunnel Group to a Subinterface

Cisco IOS Release 12.2(33)SCB4 introduces the option to add a DOCSIS Set-Top Gateway (DSG) tunnel-group to a subinterface using the **cable dsg tg** command. After adding the DSG tunnel-group to a subinterface using **cable dsg tg** command, appropriate IP Internet Group Management Protocol (IGMP) static joins are created and forwarding of DSG traffic begins.

The **cable dsg tg group-id** command was introduced in this release.

The updated section in the 'Advanced Mode DOCSIS Set-Top Gateway 1.2 for the Cisco CMTS Routers' feature guide is available at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_docsis_gw12.html

Modified Software Features in Cisco IOS Release 12.2(33)SCB4

CM Steering Enhancement

In Cisco IOS Release 12.2(33)SCB, the CM would not come online if the CM attribute did not match any channel attribute. In Cisco IOS Release 12.2(33)SCB4, if the legacy LB is configured on the channel and if the CM attribute did not match any US channel in the same legacy LB group, the CM steering feature enhancement allows the CMs to come online by skipping the CM steering check. However, the US channel must meet the requirement of the CM US attribute masks if an LBG is not configured.

For more information, refer to the *CM Steering on the Cisco CMTS Routers* at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_cm_steer.html

New Software Features in Cisco IOS Release 12.2(33)SCB3

There are no new software features in Cisco IOS Release 12.2(33)SCB3.

Modified Software Features in Cisco IOS Release 12.2(33)SCB3

There are no modified features in Cisco IOS Release 12.2(33)SCB3.

New Software Features in Cisco IOS Release 12.2(33)SCB2

There are no new software features in Cisco IOS Release 12.2(33)SCB2.

Modified Software Features in Cisco IOS Release 12.2(33)SCB2

There are no modified features in Cisco IOS Release 12.2(33)SCB2.

New Software Features in Cisco IOS Release 12.2(33)SCB1

This section describes the new cable software features in Cisco IOS Release 12.2(33)SCB1. Some features may be new to Cisco IOS Release 12.2(33)SCB1 but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.2(33)SCB1. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

Enhanced Show Tech

A new keyword, **cmts**, has been added to the **show tech-support** command to provide debugging information specific to a cable interface or a modem.

For details about this command, see the Cisco IOS CMTS Cable Command Reference at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_19_show_m_to_show_z.html#wp1011194

Cable Modem QoS Information

A new command, **show cable modem service-flow**, is introduced to provide information about all service flows associated with a particular modem.

For details about this command, see the Cisco IOS CMTS Cable Command Reference at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_16_show_cable_m_to_show_cable_u.html

SAMIS CLC-RP Traffic Throttling

The SAMIS CLC-RP traffic throttling feature limits or throttles the data collection between the cable line card and the route processor. This functionality is achieved using the new **cable metering data-per-session** command. This feature also reduces the congestion in the Broadband Processing Engine (BPE) due to the SAMIS data collection from CLC to RP.

The following commands are new or modified:

- **cable metering data-per-session**
- **show cable metering verbose**
- **cable metering destination**

For more information about these commands, see the *Cisco IOS CMTS Cable Command Reference* guide at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html

Modified Software Features in Cisco IOS Release 12.2(33)SCB1

There are no modified features in Cisco IOS Release 12.2(33)SCB1.

New Software Features in Cisco IOS Release 12.2(33)SCB

This section describes the new cable software features in Cisco IOS Release 12.2(33)SCB. Some features may be new to Cisco IOS Release 12.2(33)SCB but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.2(33)SCB. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

Bypass the 24 Hour Timer for WB CM Use of Failed RF Channels

When the CM sends a request to the CMTS for bonded service, the CMTS assigns the best available bonding group that is compatible with the CM. The CM then attempts to acquire the non-primary DS RF channels that are members of that bonding group. If the CM is unable to acquire one or more of the channels, it returns an error code causing the CMTS to mark all of the assigned RF channels as unacceptable for that CM. In prior versions, the channels so marked could not be reassigned to the same CM for up to 24 hours.

The new feature has removed the 24 hour timer required to clear these channels. Once the CM successfully completes registration, the list of failed RF channels for that CM is cleared. If the RF impairment has been eliminated when the CM re-registers, that channel can be reused immediately.

There are no new or modified commands for this feature.

For more information, see the Wideband *Modem Resiliency* feature guide at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_wm_resiliency.html

CM Steering

The Cable Modem (CM) Steering feature helps to redirect or steer CMs to multiple Cable Modem Termination Systems (CMTS) using downstream frequency overrides. A configurable string is used to bond the CM to the proper CMTS. Once the bonding is done, you can redirect or steer the CMs to one or more CMTSs using downstream frequency overrides.

The following commands are new or modified:

- **cable service type**
- **cable service type ds-frequency**
- **cable upstream attribute-mask**
- **clear cable modem attribute-masks**
- **clear cable modem service-type**
- **show cable modem service-type**

For detailed information about this feature, see the *CM Steering on the Cisco CMTS Routers* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_cm_steer.html

CMTS IPDR/SP

The Cisco universal broadband router supports the Internet Protocol Detail Record (IPDR) Streaming Protocol feature that enables efficient and reliable delivery of high volume data records from the service elements to any systems, such as mediation systems and BSS/OSS. IPDR Streaming Protocol is designed to address critical issues such as the need for a reliable, fast, efficient and flexible export process of high volume data records such as billing, performance, and diagnostic data.

The IPDR/SP process communicates with the IPDR collectors. The architecture supports primary and secondary collectors for failover purposes. At any time, data is sent only to one collector. If the exporter to primary collector connection failed due to any reason, the data is sent to a secondary collector. Depending on the network configuration, you can have multiple primary collectors designed for different types of data. For example, there may be a billing collector, a diagnostic collector, and so on.

The following commands are new in Cisco IOS Release 12.2(33)SCB.

- **ipdr session**
- **ipdr collector**
- **ipdr associate**
- **ipdr template**
- **ipdr exporter start**
- **ipdr session (global configuration)**
- **show ipdr session**
- **show ipdr session template**
- **show ipdr session collector**
- **show ipdr exporter**
- **show ipdr collector**

For more information on the IPDR, see the *Configuring IPDR Streaming Protocol on the CMTS Router* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ipdr_feature.html

DOCSIS 3.0 Multicast Support

Cisco IOS Release 12.2(33)SCB introduces multicast improvements as mandated by DOCSIS 3.0 specifications on the Cisco CMTS routers. DOCSIS 3.0 multicast support improves bandwidth efficiency and allows service providers to offer differentiated quality of service for different types of traffic.

Using the multicast improvements, the cable operators can seamlessly deliver advanced services like Video On Demand (VoD), IPTV, and facilitate interactive video and audio and data services.

The following commands are new or modified:

- **cable multicast authorization**
- **cable multicast authorization profile**
- **cable multicast group-qos**
- **cable service class**
- **match rule**
- **show cable multicast authorization**
- **show cable multicast db**
- **show cable multicast dsid**
- **show cable multicast qos**

For detailed information about this feature, see the *DOCSIS 3.0 Multicast Support on the CMTS Routers* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_d30_mcast_support.html

Dynamic Service Transaction ID Allocation

DOCSIS 2.0 mandates unique Transaction IDs (TAIDs) across transactions. The TAIDs must be unique and not incremented. The TAIDs are assigned by the senders and sometimes the TAID timeout is mismatched between senders and receivers. This affects the uniqueness of the TAID.

A TAID can be reused when the sender finishes a transaction. Similarly, DOCSIS allows the receiver to identify a transaction by TAID without the SFID. Problems arise in DSD transaction and DSA/DSC interrupted transactions, when these two requirements are combined.

The uniqueness of TAID must be ensured to resolve the interoperability issue. This is done by making the CMTS wait until T10 to reuse the same TAID. A new TAID allocation algorithm is used to fulfill this requirement.

It creates a TAID pool to replace the existing 16-bit counter. This TAID pool is monitored by timers to track the TAID expiration. A flag is assigned to each TAID in the pool to indicate its availability. When new TAID is requested, the dynamic service process checks the availability of the TAID. If the TAID is available, it is allocated to the new service flow, or else the request is rejected.

Once the TAID is allocated, the timer starts with T10 expiration time and the TAID flag is set to FALSE to indicate the unavailability of the TAID. The dynamic service process keeps track of the timer. When the time expires, the timer stops and the flag is set to TRUE to indicate the availability of the TAID.

The TAID pool is allocated and initialized at the process initialization. All timers associated with the TAIDs are added as leaf timers to the process parent timer.

For detailed information about this feature, see the *Configuring Video over DOCSIS Broadcast on the Cisco CMTS Routers* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_pktcable_mm.html

IGMP-Triggered VDOC Broadcast Support

The Cisco universal broadband router supports the Video over DOCSIS (VDOC) feature enabling multiple system operators (MSOs) to broadcast video content on RF-spanned downstream signals.

The VDOC feature facilitates broadcasting video over DOCSIS (Data Over Cable Service Interface Specification). Video streams are broadcast to one or more downstream RF channels using static multicast. Depending on the video stream selected for viewing by the IP set-top box, the multi-tuner cable modem is tuned to the appropriate RF channel carrying the specific video stream.

For more information on the VDOC, see the *Configuring Video over DOCSIS Broadcast on the Cisco CMTS Routers* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/VDOC_dbc_feature.html

IP SLAs—Random Scheduler

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_multi_scheduler.html

IP SLAs—Additional Threshold Traps

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/command/reference/sla_book.html

IP SLAs—Proactive Threshold Monitoring of IP SLAs Operations

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_threshold_mon.html

IP SLAs—Analyzing IP Service Levels Using the UDP Jitter Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_udp_jitter.html

IP SLAs—Analyzing VoIP Service Levels Using the UDP Jitter Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_udp_jitter_voip.html

IP SLAs—Analyzing IP Service Levels Using the TCP Connect Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_tcp.html

IP SLAs—Scheduler

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html

IP SLAs—Proactive Threshold Monitoring of IP SLAs Operations

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_threshold_mon.html

IP SLAs—One Way Measurement

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html

IP SLAs—Multioperation Scheduling of IP SLAs Operations

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_multi_scheduler.html

IP SLAs—MPLS VPN Awareness

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html

IP SLAs—Analyzing IP Service Levels Using the ICMP Path Echo Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_icmp_pathecho.html

IP SLAs—Analyzing IP Service Levels Using the HTTP Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_http.html

IP SLAs—Analyzing IP Service levels Using the FTP Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_ftp.html

IP SLAs—Analyzing IP Service Levels Using the DNS Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_dns.html

IP SLAs—Distribution of Statistics

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_dns.html

IP SLAs—Analyzing IP Service Levels Using the DHCP Operation

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_dhcp.html

IP SLAs—CLI Phase 3

For detailed information about this feature, see the following Cisco document:

http://www.cisco.com/en/US/docs/ios/ipsla/command/reference/sla_book.html

Load Balancing Prohibition Based on Group Policy ID

Effective with Cisco IOS Release 12.2(33)SCB, and later releases, load balancing is enhanced to use rules and policies to decide on moving the CMs within their LB groups. These policies are created on the CMTS and chosen on a per-CM basis using TLV portion (43.1, Policy ID) of REG-REQ. These policies prohibit a modem from being moved or restricted.

A policy contains a set of rules. When it is defined by multiple rules, all rules apply in combinations. A rule can be defined as "enabled", "disabled", or "disabled during time period."

Each rule can be used by more than one policy. When it is defined by multiple rules, all rules apply in combinations. Each rule helps to prohibit load balancing using a particular CM and to prohibit load balancing using a particular CM during certain times of the day.

For detailed information about this feature, see the *Load Balancing and Dynamic Channel Change on the Cisco CMTS Routers* document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_load-bal_dcc.html

RSVP-Based Video on Demand Support over DOCSIS

The Cisco universal broadband router supports Video on Demand over DOCSIS (Data Over Cable Service Interface Specification) services using RSVP (Resource ReSerVation Protocol) bandwidth request from the VoD server. The RSVP protocol is used by the Cable Modem Termination System (CMTS) to request video data from the network for specific application data flows.

The RSVP protocol is used by a host to request specific qualities of service (QoS) from the network for particular application data streams or flows. RSVP is used by the CMTS to deliver video requests along the data path of the flows and maintains the state to provide the requested service. RSVP requests will generally result in resources being reserved in each node along the data path.

The following commands are new in Cisco IOS Release 12.2(33)SCB.

- **cable rsvp default-scen**
- **show cable rsvp flow-db**

For more information on the RSVP, please see

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/VDOC_rsvp_feature.html

Subscriber Management Packet Filtering for DOCSIS 2.0

The Cisco universal broadband router supports management of data packet filtering based on the subscriber's preferences and criteria. Packet filtering enhances security to the cable network by allowing only the specific packets to flow to the Customer Premise Equipment (CPE) while dropping the unwanted data packets from the cable network. The Cisco uBR7225VXR router and Cisco uBR7246VXR router support this feature.

A filter group specifies what filters are applied to the packets going to or coming from each specific CM or CPE device. It defines the rules or criteria to filter or drop a packet. Every packet that has to be filtered can either be accepted to send or filtered to be dropped. The criteria to filter a packet depends on the subscriber's preferences. The filter group can be applied to different subscriber management groups.

The following commands are new or modified in Cisco IOS Release 12.2(33)SCB.

- **cable filter group**
- **cable submgmt default filter-group**

For more information on the subscriber management packet filtering, please see

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/SMPF_feature.html

Subscriber ID Support for Packetcable

Subscriber ID is added to all Gate Control messages and enhances error codes returned from the Cable Modem Termination System (CMTS).

Previously, the Gate ID was unique only to individual CMTS systems, with the CMTS proxying all CMS (Call Management Server) Gate control messaging through a central device which manages the CMTS connections on the behalf of the CMS. The CMS had a single Common Open Policy Service (COPS) association to the proxy device. Therefore, the Gate IDs could be duplicated when using multiple CMTS systems.

The new PacketCable Subscriber ID feature adds a Subscriber ID to each Gate Control message to disambiguate the Gate IDs between the CMS and proxy device. The Subscriber ID parameter is added to the following COPS messages:

- GATE-INFO
- GATE-DELETE
- GATE-OPEN
- GATE-CLOSE

The Subscriber ID is available at the CMS and is used in the Gate-Set messages. Additionally, the error codes returned from CMTS or its proxy are enhanced to include more specific information about gate operation failures.

To enable this feature, a new command is introduced: `packetcable gate send-subscriber ID` used in global configuration mode. For more information, see the Packetcable feature in the Cisco IOS CMTS Cable Command Reference Guide at

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_pktcable_mm.html

Subscriber Traffic Management Version 1.2

The STM feature enables service providers to identify and control subscribers who exceed the maximum bandwidth allowed under their registered quality of service (QoS) profiles. STM works as a low CPU alternative to Network-Based Application Recognition (NBAR) and access control lists (ACLs), however, using STM does not mean that NBAR and ACLs have to be turned off; STM can be applied along with NBAR and ACLs. STM also works in conjunction with the Cisco Broadband Troubleshooter to support additional network management and troubleshooting functions in the Cisco CMTS.

The STM Version 1.2 feature is enhanced in Cisco IOS Release 12.3(23)BC2 and integrated into Cisco IOS Release 12.2(33)SCB with the following support on the Cisco uBR7246VXR Universal Broadband Routers:

- Support for suspension of the cable modem (CM) penalty period at a certain time of day.
- Support for weekday and weekend traffic monitoring.
- Support of up to 40 total enforce rules.
- Support for service providers to change subscriber service classes for a particular modem using the `cable modem service-class-name` command.

Addition of the following SNMP objects to the CISCO-CABLE-QOS-MONITOR-MIB:

- `ccqmCmtsEnfRulePenaltyEndTime`
- `ccqmCmtsEnfRuleWkndOff`
- `ccqmCmtsEnfRuleWkndMonDuration`
- `ccqmCmtsEnfRuleWkndAvgRate`
- `ccqmCmtsEnfRuleWkndSampleRate`
- `ccqmCmtsEnfRuleWkndFirstPeakTime`
- `ccqmCmtsEnfRuleWkndFirstDuration`

- ccqmCmtsEnfRuleWkndFirstAvgRate
- ccqmCmtsEnfRuleWkndSecondPeakTime
- ccqmCmtsEnfRuleWkndSecondDuration
- ccqmCmtsEnfRuleWkndSecondAvgRate
- ccqmCmtsEnfRuleWkndOffPeakDuration
- ccqmCmtsEnfRuleWkndOffPeakAvgRate
- ccqmCmtsEnfRuleWkndAutoEnforce

The following commands are new or modified:

- **cable modem service-class-name**
- **penalty-period**
- **show cable qos enforce-rule verbose**
- **weekend duration**
- **weekend off**
- **weekend peak-time1**

For detailed information about this feature, see the Subscriber Traffic Management on the Cisco CMTS Routers document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_sbsbr_tfmgt.html

Upstream Utilization Optimization

The Upstream (US) Utilization Optimization feature on the Cisco Cable Modem Termination System (CMTS) routers provides higher upstream throughput. It provides the following benefits and functions on a Cisco CMTS router:

- Group configuration mode enables rate-adapt eligibility on all cable modem upstream flows.
- Local configuration mode enables rate-adapt eligibility on a specific upstream, provides configuration of selective parameters, and provides that local configuration overrides any global configuration.

The following commands are new or modified:

- **cable upstream rate-adapt (global)**
- **cable upstream rate-adapt (interface)**
- **show cable rate-adapt**
- **show interface cable sid**
- **show interface cable upstream**

For detailed information about this feature, see the Upstream Utilization Optimization on the Cisco CMTS Routers document at:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_upstream_rate_adapt.html

Modified Software Features in Cisco IOS Release 12.2(33)SCB

There are no modified software features in Cisco IOS Release 12.2(33)SCB.

MIBs

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check verifies that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password is e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://tools.cisco.com/RPF/register/register.do>

For information about the MIBs supported by the Cisco universal broadband routers, see the *Cisco CMTS Universal Broadband Series Router MIB Specifications Guide*.

New and Changed MIB Information in Cisco IOS Release 12.2(33)SCB

The Cisco universal broadband routers include or add support for the following MIBs in Cisco IOS Release 12.2(33)SCB:

- CLAB-TOPO-MIB
- DOCS-DIAG-MIB
- DOCS-DRF-MIB
- DOCS-IF3-MIB
- DOCS-IETF-CABLE-DEVICE-NOTIFICATION-MIB
- DOCS-IETF-BPI2-MIB
- DOCS-IETF-QOS-MIB
- DOCS-IFEXT2-MIB
- DOCS-QOS3-MIB
- DOCS-TEST-MIB

Limitations and Restrictions

This section describes restrictions for the Cisco universal broadband routers in Cisco IOS Release 12.2(33)SCB.

Unsupported Hardware

For a list of unsupported hardware, see the End-of-Life and End-of-Sale Notices at the following URLs:

- http://www.cisco.com/en/US/products/hw/cable/ps2217/prod_eol_notices_list.html

Software Feature Restrictions

This section describes other important guidelines or restrictions to consider when running Cisco IOS Release 12.2SC that might not yet be documented in the supporting customer documentation.

DOCSIS

- You cannot configure an upstream connector to more than one fiber node.
- Multicast over DOCSIS L2VPN does not work for a DOCSIS 3.0-bonded cable modem (CM) when DOCSIS L2VPN is provisioned on a DOCSIS 3.0-bonded CM and downstream multicast traffic is sent over L2VPN. You can use a DOCSIS L2VPN classifier to classify multicast traffic on a secondary DS service flow with SF attributes (TLV 25.31/32) specifying primary DS for the CM. As a result, L2VPN multicast traffic will use the primary DS and L2VPN unicast traffic will be forwarded over the primary bonding group. The service flow attribute feature is available in Cisco IOS Release 12.2SCB.

MIBs Restriction

- IP-MIB is implemented as read-only. Writing is not supported for `ipv6IPForwarding` or `ipv6IpDefaultHopLimit`.
- `docsIf3MdCfgMcastDsidFwdEnabled` object is implemented as read-only.
- `cdxBWQueueMaxDepth` object sometimes reports a value out of range. The supported range is from 0 to 64, but the object sometimes returns a value of 128 when queried.

PacketCable

Payload Header Suppression (PHS) is not supported on wideband Embedded Media Terminal Adapters (eMTAs) for dynamic downstream service flows.

PXF

Statistics for two different divert-rate limit (DRL) WAN-IP streams can momentarily overlap or collide and produce statistics that are lower than expected.

Redundancy

- Although the software does not prevent it, pre-configuring commands on a protect line card is not supported.
- A dynamic service-flow for a PacketCable call is not deleted during a line card switchover.
- Although the Cisco CMTS router is initially configured only for global N+1 redundancy, the **show running-configuration** command displays both global and legacy interface-level Hot-Standby Connection-to-Connection Protocol (HCCP) configuration when you change redundancy mode configuration from SSO to RPR mode. If you switch back to SSO mode, both redundancy configurations are still shown.
- In very rare circumstances after an N+1 switchover, upstream traffic that is using Baseline Privacy Interface (BPI) encryption is not received properly by the CMTS router. Input errors are logged on the interface and the **debug cable error** command shows error messages similar to the following:

```
Cable5/1/4: Bad rx packet. JIB status code 0xA
```

The issue occurs on upstream channels that use a “shared” connector, where the other upstream channel using the same shared connector is on another downstream and is shutdown. To workaroud this issue, you can activate the downstream and other upstream channel using the same shared connector or temporarily unshare the upstream connector.

Wideband

- If you configure a wideband interface with more than one MAC domain host sharing the committed information rate (CIR) bandwidth, then the total wideband interface CIR bandwidth gets fragmented among the MAC Domain hosts sharing the WB interface CIR bandwidth.

The WB interface CIR bandwidth can be shared by multiple MAC domain hosts, and these MAC domain hosts could potentially be on the same or different cable line cards. As admission control for WB interfaces happens on cable line cards, the available CIR bandwidth gets partitioned and given to the MD hosts causing the bandwidth fragmentation. However if a typical service flow CIR is very small compared to the total CIR of the wideband interface, then this fragmentation is not visible until the CIR usage reaches very high levels close to the total interface bandwidth.

With certain bandwidth percent configuration and traffic distribution, the overall link utilization of dynamic bandwidth sharing (DBS) can be as low as 85%. For example, this can occur if the traffic rate on a wideband interface is smaller than its configured bandwidth percent, but the traffic rate on a modular-cable interface is much larger than its bandwidth percent. The packet drops happen only on the modular-cable interface which has a larger amount of traffic than its bandwidth-percent. To workaroud this scenario, configure a higher bandwidth percentage to the modular-cable interface, which is larger than or equal to its expected/average traffic rate.

Important Notes



Note

This section is subject to change and is not intended to cover all changes found in the software. There may be other changes within the software that are not identified here, such as within the new and modified features. Closely read these release notes in their entirety, as well as review the related caveats documents for more information.

Table 7 identifies some of the key changes that you should consider when running Cisco IOS Release 12.2(33)SCB.

Table 7 Important Changes in Cisco IOS Release 12.2SC

Change Description	Release Introduced
<p>Clearing Address Resolution Protocol (ARP) Entries</p> <p>Using the clear arp command can take about 15 seconds to remove all ARP table entries.</p>	12.2(33)SCA
<p>Point-to-Point over Ethernet Configuration</p> <p>For Point-to-Point over Ethernet (PPoE) configuration on the Cisco uBR7200 series routers, the bba-group command replaces the vpdn-group command. The software automatically converts an existing vpdn-group configuration to bba-group global configuration. After the configuration of bba-group, you cannot configure PPoE at the virtual private dialup network (VPDN) level. You need to use the bba-group configuration.</p>	12.2(33)SCA
<p>DOCSIS</p> <p>CM-STATUS messages are enabled by default.</p>	12.2(33)SCB

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

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