



CHAPTER 1

Introduction

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

For software caveats that apply to the Cisco IOS Release 12.2(33)SCC 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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- [New and Changed Information, page 1-9](#)
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System Requirements

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

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- [Hardware Supported, page 1-2](#)
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Memory Requirements

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


Note

Effective with Cisco IOS Release 12.2(33)SCC, the image size is greater than 65 MB and requires TFTP servers capable of downloading large images.

[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)SCC.

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

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)SCC.

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

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
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

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-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			
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)SCC
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

To choose a new Cisco IOS software release based on information about defects that affect that software, use Bug Search Tool (BST) at the following URL:

<https://tools.cisco.com/bugsearch/>

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	<p>Describes a set of Cisco CMTS documents and contains links to the referenced documents.</p> <p>Go to the following link to access this document: http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/roadmap/7200rdmp.html</p>
Command Reference	<p>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.</p> <p>Go to the following link to access this document: http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html</p>
Design Guides	<p>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.</p> <p>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</p>
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

Guide	Description
Error and System Messages	Lists error and system messages for a Cisco CMTS, including any recommended user action for each message. Go to the following link to access this document: http://www.cisco.com/en/US/docs/cable/cmts/system/message/uberrmes.html
Troubleshooting Guides	Provides problem-solving techniques for a Cisco CMTS, including methods to identify problems based on symptoms and recommended actions for resolution. 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

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)SCC:

- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC7, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC6, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC5, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC4, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC3, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC2, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC1, page 1-10](#)
- [New Hardware Features in Cisco IOS Release 12.2\(33\)SCC, page 1-11](#)
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC7, page 1-11](#)
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC7, page 1-11](#)
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC6, page 1-11](#)
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC6, page 1-11](#)
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC5, page 1-11](#)

- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC5](#), page 1-12
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC4](#), page 1-12
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC4](#), page 1-14
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC3](#), page 1-14
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC3](#), page 1-14
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC2](#), page 1-14
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC2](#), page 1-14
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC1](#), page 1-14
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC1](#), page 1-15
- [New Software Features in Cisco IOS Release 12.2\(33\)SCC](#), page 1-15
- [Modified Software Features in Cisco IOS Release 12.2\(33\)SCC](#), page 1-18

New Hardware Features in Cisco IOS Release 12.2(33)SCC7

There are no new hardware features in Cisco IOS Release 12.2(33)SCC7.

New Hardware Features in Cisco IOS Release 12.2(33)SCC6

There are no new hardware features in Cisco IOS Release 12.2(33)SCC6.

New Hardware Features in Cisco IOS Release 12.2(33)SCC5

There are no new hardware features in Cisco IOS Release 12.2(33)SCC5.

New Hardware Features in Cisco IOS Release 12.2(33)SCC4

There are no new hardware features in Cisco IOS Release 12.2(33)SCC4.

New Hardware Features in Cisco IOS Release 12.2(33)SCC3

There are no new hardware features in Cisco IOS Release 12.2(33)SCC3.

New Hardware Features in Cisco IOS Release 12.2(33)SCC2

There are no new hardware features in Cisco IOS Release 12.2(33)SCC2.

New Hardware Features in Cisco IOS Release 12.2(33)SCC1

There are no new hardware features in Cisco IOS Release 12.2(33)SCC1.

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

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

New Software Features in Cisco IOS Release 12.2(33)SCC7

There are no new software features in Cisco IOS Release 12.2(33)SCC7.

Modified Software Features in Cisco IOS Release 12.2(33)SCC7

There are no modified software features in Cisco IOS Release 12.2(33)SCC7.

New Software Features in Cisco IOS Release 12.2(33)SCC6

This section lists the new features in Cisco IOS Release 12.2(33)SCC6. Some of the features that were released in earlier Cisco IOS software releases are now supported in Cisco IOS Release 12.2(33)SCC6.

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)SCC6

There are no modified software features in Cisco IOS Release 12.2(33)SCC6.

New Software Features in Cisco IOS Release 12.2(33)SCC5

There are no new software features in Cisco IOS Release 12.2(33)SCC5.

Modified Software Features in Cisco IOS Release 12.2(33)SCC5

There are no modified software features in Cisco IOS Release 12.2(33)SCC5.

New Software Features in Cisco IOS Release 12.2(33)SCC4

There are no new software features in Cisco IOS Release 12.2(33)SCC4.

Features Integrated into Cisco IOS Release 12.2(33)SCC4

The following features introduced in Cisco IOS Release 12.2(33)SCD2 are now supported in Cisco IOS Release 12.2(33)SCC4:

CMTS Upstream Traffic Prioritization

With the CMTS Upstream Traffic Prioritization feature, you can now set the priority of the QoS profile-2 to a higher value. This higher priority ensures that the Cisco CMTS allows bandwidth request from an initializing cable modem to get precedence over those from online cable modems.

For more information, see the *Configuring Upstream Cable Interface Features on the Cisco CMTS Routers* document at:

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

Dynamic Insertion of TFTP Server tlv for CM Firmware Upgrade

This feature describes how to upgrade firmware on cable modems by dynamically inserting the correct TLV values in the DOCSIS configuration file, which is downloaded by the cable modem. The **cable dynamic-secret tftp insert-upgrade-server** command was added to support dynamic insertion of the TFTP server address in the DOCSIS configuration file.

For detailed information about upgrading firmware on the cable modems, see the *Configuring a Dynamic Shared Secret for the Cisco CMTS* document at:

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

SAMIS Inactive Service Flow and Channel Utilization Interval CLIs

A new keyword, **full-records**, has been added to the **cable metering destination** and **cable metering filesystem** commands to provide information about both, active and idle service flow records.

A new command, **cable util-interval**, has been introduced to configure the interval of the channel utilization. This command can be used for both, cable line cards and the SPA channel.

For more information, see the *Usage-Based Billing for the Cisco CMTS Routers* document at:

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

Show Cable Modem Partial Mode

A new command, **show cable modem partial-mode**, was introduced in Cisco IOS Release 12.2(33)SCD2 to display information about the cable modems that are in upstream and downstream partial service mode.

For more information 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

Subscriber Traffic Management version 1.3

The Subscriber Traffic Management (STM) feature allows the service provider to configure a maximum bandwidth threshold over a fixed time period, for a specific service-class (or QoS-profile). The subscribers who exceed this configured threshold are identified and allocated with a reduced QoS. 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.

Following are the enhancements in STM Version 1.3:

- Support for configuring minute-level peak time: Peak time can now be configured in the hh:mm format, which enables a user to pinpoint the exact time at which monitoring should start.
- Support for configuring minute-level penalty end time: Penalty end time can now be configured in the hh:mm format, which enables a user to pinpoint the exact time at which monitoring should stop.
- Ability to configure a unique penalty duration for weekdays and weekends.
- Ability to specify whether the monitoring should be turned on after the cable modem is released from the penalty.

The following SNMP objects have been added to the CISCO-CABLE-QOS-MONITOR-MIB:

- ccqmCmtsEnfRuleFirstPeakTimeMin
- ccqmCmtsEnfRuleSecondPeakTimeMin
- ccqmCmtsEnfRuleWkndFirstPeakTimeMin
- ccqmCmtsEnfRuleWkndSecondPeakTimeMin
- ccqmCmtsEnfRulePenaltyEndTimeMin
- ccqmCmtsEnfRuleWkPenaltyPeriod
- ccqmCmtsEnfRuleWkndPenaltyPeriod
- ccqmCmtsEnfRuleRelTimeMonitorOn

The following commands are new or modified:

- **duration**
- **peak-time1**
- **penalty-period**
- **show cable qos enforce-rule verbose**
- **weekend duration**
- **weekend peak-time1**

For more information about this feature, see the *Subscriber Traffic Management* feature guide at the following URL:

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

Upstream Weighted Fair Queuing

The upstream weighted fair queuing (WFQ) is a quality of service (QoS) feature that enables the Cisco CMTS router to allocate optimum bandwidth to upstream service flows based on the WFQ parameter configurations. To enable upstream WFQ, you must configure either the class-based or activity-based WFQ on a cable interface.

The following commands are new or modified:

- **cable upstream qos wfq**
- **show interface cable mac-scheduler**

For more information about this feature, see the *Upstream Channel Bonding* feature guide at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_uscb_ps2209_TSD_Products_Configuration_Guide_Chapter.html

Modified Software Features in Cisco IOS Release 12.2(33)SCC4

There are no modified software features in Cisco IOS Release 12.2(33)SCC4.

New Software Features in Cisco IOS Release 12.2(33)SCC3

There are no new software features in Cisco IOS Release 12.2(33)SCC3.

Modified Software Features in Cisco IOS Release 12.2(33)SCC3

There are no modified software features in Cisco IOS Release 12.2(33)SCC3.

New Software Features in Cisco IOS Release 12.2(33)SCC2

There are no new software features in Cisco IOS Release 12.2(33)SCC2.

Modified Software Features in Cisco IOS Release 12.2(33)SCC2

There are no modified software features in Cisco IOS Release 12.2(33)SCC2.

New Software Features in Cisco IOS Release 12.2(33)SCC1

There are no new software features in Cisco IOS Release 12.2(33)SCC1.

Features Integrated into Cisco IOS Release 12.2(33)SCC1

The following features introduced in earlier Cisco IOS Releases are now supported in Cisco IOS Release 12.2(33)SCC1:

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)SCC1

There are no modified software features in Cisco IOS Release 12.2(33)SCC1.

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

This section describes the new cable software features in Cisco IOS Release 12.2(33)SCC. Some features may be new to Cisco IOS Release 12.2(33)SCC 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)SCC. 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.

Cable IPC Statistics Collection Tool

The Cable Interprocess Communication (IPC) Statistics Collection tool provides debugging information about all CMTS related IPC messages. You can use this tool to analyze the IPC traffic in a cable communications network.

The following commands are new or modified:

- **cable ipc-stats**
- **clear cable ipc-stats**
- **show cable ipc-stats**

For more information about the feature, see:

http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/ubr_ipc_stats_ps2209_TSD_Products_Configuration_Guide_Chapter.html

Embedded Event Manager

For detailed information about this feature, see the Embedded Event Manager Overview feature guide at the following URL:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_eem_overview.html

IPv6 Dual Stack CPE Support on the CMTS

From Cisco IOS Release 12.2(33)SCC onwards, CMTS also supports dual-stack that is both IPv4 and IPv6 addressing on the customer premises equipment (CPE). CMTS also supports IPv6 over bundle subinterfaces.

There are no new or modified commands for this feature. For detailed information about this feature, see the IPv6 on Cable document at:

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

MPLS Pseudowire for Cable L2VPN

The Multiprotocol Label Switching (MPLS) Pseudowire for Cable Layer 2 Virtual Private Network (L2VPN) feature enables service providers to use a single, converged, Internet Protocol (IP)/MPLS network infrastructure to offer Ethernet data link layer (Layer 2) connectivity to two or more VPN customer sites.

The MPLS Pseudowire for Cable L2VPN feature is fully compliant with CableLabs Business Services over DOCSIS (BSOD) L2VPN specification, and is an extension to the existing DOCSIS L2VPN features supported on Cisco CMTS routers.

The following commands are new or modified:

- **cable l2vpn**
- **cable l2-vpn-service xconnect**
- **cable set mpls-experimental**
- **service instance**
- **show cable l2-vpn xconnect**
- **show mpls l2transport vc**
- **show xconnect**
- **xconnect**

For detailed information about this feature, see:

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

Restricted/General Load Balancing and Narrowband Dynamic Bandwidth Sharing with Downstream Dynamic Load Balancing

In Cisco IOS Release 12.2(33)SCC, support for the restricted load balancing group (RLBG)/general load balancing group (GLBG) is based on DOCSIS 2.0 and 3.0 specifications. Using the DOCSIS 3.0 modem-based load balancing specifications, you can manage the load balancing (LB) activity on a per-modem basis. Implementing the DOCSIS 3.0 modem-based LB specifications enables the Cable Modem Termination Systems (CMTS) to provide an advanced service-based LB. With the service-based LB enabled, existing service-based CM segregation features and channel restriction become special cases and can be handled within the same LB framework.

Narrowband (NB) dynamic bandwidth sharing (DBS) with dynamic load balancing (DLB) is also supported and uses radio frequency (RF) channel utilization instead of interface utilization, for load balancing. In earlier releases, there was a restriction on modular cable (MC) interfaces using DBS included in a LB group. In Cisco IOS Release 12.2(33)SCC, a new measurement of link utilization is introduced to overcome the restriction of load balancing on an MC interface using DBS.

The following commands are new or modified in Cisco IOS Release 12.2(33)SCC:

- **cable load-balance docsis-group**
- **cable load-balance d30-ggrp-default**
- **cable load-balance modem max-failures**
- **cable load-balance restrict modem**
- **cable tag**
- **show cable load-balance docsis-group**
- **show cable fiber-node**
- **cable load-balance docsis-enable**
- **docsis-policy**
- **docsis-version**
- **downstream**
- **init-tech-list**
- **init-tech-ovr**
- **interval**
- **method**
- **name**
- **oui**
- **override**
- **policy**
- **restricted**
- **service-class**
- **service-type-id**
- **service-type-id_(cmts-tag)**
- **tag**
- **threshold**
- **upstream_(config-lb-group)**
- **cable load-balance rule**
- **show cable load-balance**
- **cable load-balance docsis-policy**

For detailed information about this feature, refer the following guides.

Restricted/General Load Balancing and Narrowband Dynamic Bandwidth Sharing with Downstream Dynamic Load Balancing document at:

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

CM Steering on the Cisco CMTS Routers guide at:

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

Three Steps Dynamic Modulation Profiles

Three Step Dynamic Modulation allows you to create and use an optional third modulation profile in the Dynamic Upstream Modulation feature, to increase the upstream throughput and to satisfy the demand for new spectrum management.

For more details on this feature, refer to *Spectrum Management and Advanced Spectrum Management for the Cisco CMTS* guide at the following location:

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

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

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

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)SCC

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

New MIBs added in this release:

- CISCO-CABLE-L2VPN-MIB
- CISCO-IETF-PW-MIB
- CISCO-IETF-PW-MPLS-MIB
- DOCS-IF-M-CMTS-MIB
- DOCS-LOADBAL3-MIB
- DOCS-LOADBALANCING-MIB
- DOCS-MCAST-AUTH-MIB

- DOCS-SEC-MIB
- DOCS-SUBMGT3-MIB
- ENTITY-SENSOR-MIB
- MPLS-LSR-MIB
- MPLS-LDP-MIB
- MPLS-TE-MIB
- MPLS-TE-STD-MIB

Updated MIBs for this release:

- CISCO-CABLE-ADMISSION-CTRL-MIB
- CISCO-CABLE-SPECTRUM-MIB
- CISCO-CABLE-WIDEBAND-MIB
- CISCO-ENTITY-SENSOR-MIB
- DOCS-BPI-PLUS-MIB
- DOCS-CABLE-DEVICE-MIB
- DOCS-IF3-MIB
- DOCS-IF-MIB
- DOCS-DRF-MIB
- DOCS-DSG-IF-MIB
- DOCS-QOS3-MIB
- DTI-MIB
- ENTITY-MIB
- IF-MIB

Limitations and Restrictions

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

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 workaround 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)SCC.

Table 7 Important Changes in Cisco IOS Release 12.2SC

Change Description	Release Introduced
Clearing Address Resolution Protocol (ARP) Entries Using the clear arp command can take about 15 seconds to remove all ARP table entries.	12.2(33)SCA
Point-to-Point over Ethernet Configuration 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.	12.2(33)SCA
DOCSIS CM-STATUS messages are enabled by default.	12.2(33)SCB
MQC Change between 12.3BC and 12.2SC and the DOCSIS WFQ Implementation The priority command does not have any arguments. You must use the police command to specify a guaranteed bandwidth	12.2(33)SCC

Table 7 Important Changes in Cisco IOS Release 12.2SC (continued)

Change Description	Release Introduced
<p>Logical Channel Support</p> <p>To support logical channel feature, the ordering of the "channel-width" and "docsis-mode" parameters have changed in the cable upstream docsis-mode and cable upstream channel-width commands. Since "channel-width" is a physical channel level parameter, it must be configured before "docsis-mode" which is a logical channel level parameter.</p> <p>For more details on this feature, see the <i>SCDMA and Logical Channel Support on the Cisco CMTS Routers</i> at the following location:</p> <p>http://www.cisco.com/en/US/docs/ios/cable/configuration/guide/cmts_d30_scdma_lc.html</p>	12.2(33)SCC
<p>Behavior Change in DSG Tunnel</p> <p>When DOCSIS Set-top Gateway (DSG) is configured to have a quality of service (QoS) for the DSG tunnel, ensure that the default multicast QoS (MQoS) is configured by using the command</p> <p>cable multicast group-qos default scn <i>service class name</i> aggregate</p> <p>where <i>service class name</i> is any service class name.</p> <p>Note that:</p> <ul style="list-style-type: none"> • If the last service class name is not configured with the DSG tunnel, you are prompted to remove the default MQoS, if it is not required. • If the service class name is configured with the DSG tunnel when no default MQoS exists, the configuration is rejected and you are prompted to configure the default MQoS. • If you are using an earlier Cisco IOS image, then while upgrading to the Cisco IOS Release 12.2(33)SCC1, during reload if the service class name is configured with the DSG tunnel and the default MQoS does not exist, the default MQoS is automatically configured. • The wideband interface is used to send multicast traffic when no MQoS is configured. After you configure the default MQoS, the primary downstream channel is used to forward the multicast traffic. However, the multicast session on the wideband interface is not deleted. This may cause duplicate traffic to be sent for the same multicast stream. Wait for 180 seconds for the old session to time out. • This behavior is observed only when you toggle (enable/disable) the default MQoS. 	12.2(33)SCC

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: <http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>.

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