



Release Notes for Cisco CVA120 Series Cable Voice Adapter for Cisco IOS Release 12.2 XA

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Note

You can find the most current Cisco IOS documentation on Cisco.com. This set of electronic documents may contain updates and modifications made after this document was published.

These release notes describe the enhancements provided in Cisco IOS Release 12.2(2)XA4 for the Cisco CVA120 series of cable voice adapters (CVA), which includes the Cisco CVA122 Cable Voice Adapter and the Cisco CVA122E Cable Voice Adapter. These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, and related documents.



Note

Unless otherwise indicated, the terms Cisco CVA120 Series Cable Voice Adapter and cable voice adapter refer to both the Cisco CVA122 Cable Voice Adapter and Cisco CVA122E Cable Voice Adapter.

For a list of software caveats that apply to Release Number_xa4, see the [“Caveats” section on page 24](#) and *Caveats for Cisco IOS Release 12.2 T*. The caveats document is updated for every maintenance release and is located on Cisco.com and the Documentation CD-ROM.

Use these release notes with *Cross-Platform Release Notes for Cisco IOS Release 12.2* located on Cisco.com and the Documentation CD-ROM. For complete documentation on the Cisco CVA120 Series Cable Voice Adapter, see the documentation listed in the [“Related Documentation” section on page 28](#).

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Introduction

For information on new features and Cisco IOS commands supported by Cisco IOS Release 12.2(2)XA4, see the [“New and Changed Information” section on page 7](#) and the [“Related Documentation” section on page 28](#).

The Cisco CVA120 Series Cable Voice Adapter gives residential subscribers high-speed Internet access. The cable voice adapter supports data traffic via a shared two-way cable system and Internet Protocol (IP) backbone network. The cable voice adapter connects computers and other customer premises devices at a subscriber site to the service provider’s cable, hybrid-fiber coax (HFC), and IP backbone network.

The Cisco CVA120 series of cable voice adapters are based on Data-over-Cable Service Interface Specifications (DOCSIS) and European DOCSIS (EuroDOCSIS) standards. Depending on the model, they interoperate with any bidirectional, DOCSIS-qualified or EuroDOCSIS-qualified Cable Modem Termination System (CMTS). The cable voice adapter ships from the Cisco factory with a Cisco IOS software image stored in nonvolatile Flash memory that supports DOCSIS-compliant and EuroDOCSIS-compliant bridging operations.

The cable voice adapter uses its cable interface to connect to the CMTS over the HFC cable system. A personal computer (PC) connects to the cable voice adapter through either the Ethernet or Universal Serial Bus (USB) interface. The cable voice adapter then provides Internet access by forwarding traffic between the PC and the CMTS, creating a high-speed, permanent access to the Internet.

If supported by the service provider, the cable voice adapter can connect to multiple PCs by attaching a PC to each interface (Ethernet and USB). In addition, the cable voice adapter’s Ethernet interface can connect to an Ethernet hub, and multiple computers can then be connected to the hub.



Note

The cable voice adapter does not support networking multiple PCs using a USB bridging hub.

In addition to providing DOCSIS/EuroDOCSIS connectivity, the cable voice adapter can optionally provide Voice over IP (VoIP) services, allowing subscribers to make telephone, modem, and fax calls over Transmission Control Protocol (TCP)/IP networks such as the Internet. These calls can be made to other VoIP devices, or to telephone, modem, or fax devices on the regular telephone network (the Public Switched Telephone Network, commonly known as PSTN).

The cable voice adapter can also function as an advanced router, providing wide area network (WAN) data connectivity in a variety of configurations.

Cisco CVA122 Cable Voice Adapter

The Cisco CVA122 Cable Voice Adapter features one F-connector interface to the cable system, one RJ-45 (10BASE-T Ethernet) hub port, one USB device port, and two RJ-11 analog voice ports. The USB interface enables the cable voice adapter to connect to a PC with a USB interface, without having the user to open the unit and install an Ethernet network interface card (NIC). If supported by the PC and service provider, PCs can be connected to the cable voice adapter using both the Ethernet and USB interfaces.

The Cisco CVA122 Cable Voice Adapter supports the DOCSIS standard, which was developed with service providers to ensure that any DOCSIS-certified cable modem can interoperate with any bidirectional, DOCSIS-qualified CMTS. The DOCSIS standard supports the North American National Television Systems Committee (NTSC) channel plan, with 6 MHz channel widths, a downstream range of 88 to 860MHz, and an upstream range of 5 to 42 MHz.

The feature sets available in Release 12.2(2)XA4 for the Cisco CVA122 Cable Voice Adapter include the DOCSIS IP Bridging, IP Routing, and the Easy IP feature sets.

Cisco CVA122E Cable Voice Adapter

The Cisco CVA122E Cable Voice Adapter features one F-connector interface to the cable system, one RJ-45 (10BASE-T Ethernet) hub port, one USB device port, and two RJ-11 analog voice ports. The USB interface enables the cable voice adapter to connect to a PC with a USB interface, without having the user to open the unit and install an Ethernet network interface card (NIC). If supported by the PC and service provider, PCs can be connected to the cable voice adapter using both the Ethernet and USB interfaces.

The Cisco CVA122E Cable Voice Adapter supports the EuroDOCSIS standard, which is almost identical to the DOCSIS standard, except that it supports the European Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans, with 8 MHz channel widths, a downstream range of 88 to 860MHz, and an upstream range of 5 to 65 MHz.

The feature sets available in Release 12.2(2)XA4 for the Cisco CVA122E Cable Voice Adapter include the DOCSIS IP Bridging, IP Routing, and the Easy IP feature sets.

Early Deployment Releases

These release notes describe the cable voice adapter for Cisco IOS Release 12.2(2)XA4, which is an early deployment (ED) release based on Cisco IOS Release 12.2(2)T. Early deployment releases contain fixes for software caveats and support for new Cisco hardware and software features.

[Table 1](#) shows the early deployment releases for the Cisco CVA120 series cable voice adapter.

Table 1 Early Deployment Releases for the Cisco CVA120 Series Cable Voice Adapter

ED Release	Additional Software Features	Hardware Supported	Hardware Availability
Cisco IOS Release 12.2(2)XA4	<ul style="list-style-type: none"> None 	Cisco CVA122E Cisco CVA122	Now
Cisco IOS Release 12.2(2)XA1	<ul style="list-style-type: none"> None 	Cisco CVA122E Cisco CVA122	Now

Table 1 Early Deployment Releases for the Cisco CVA120 Series Cable Voice Adapter (continued)

ED Release	Additional Software Features	Hardware Supported	Hardware Availability
Cisco IOS Release 12.2(2)XA	<ul style="list-style-type: none"> H.323v2 Protocol, SGCP and MGCP Protocol Stack, IP Routing Operations H.323v2 caller ID support Call Progress Tone support for the Czech Republic and Mexico 	Cisco CVA122E Cisco CVA122	Now
Cisco IOS Release 12.1(5)XU2	<ul style="list-style-type: none"> None 	Cisco CVA122E Cisco CVA122	Now
Cisco IOS Release 12.1(5)XU	<ul style="list-style-type: none"> Cable Monitor Web Diagnostics Tool Cisco Secure Intrusion Detection System (IDS) (formerly known as NetRanger) support DOCSIS 1.0+ Extensions—Dynamic Multi-SID Assignment and Concatenation DOCSIS Baseline Privacy (BPI) Dynamic Host Configuration Protocol (DHCP) Proxy Support Enhanced IP bridging functionality Full and DOCSIS/EuroDOCSIS-compliant bridging NAT¹ - support for NetMeeting Directory (Internet Locator Service - ILS) Network address translation and port address translation (NAT/PAT) Parser Cache RFC 2233 support for link up/down traps and for the IF-MIB MIB² Routing (RIP V2³) Secure Shell (SSH) Version 1 Support 	Cisco CVA122	Now

1. NAT = Network Address Translation

2. MIB = Management Information Base

3. RIP V2 = Routing Information Protocol version 2

System Requirements

This section describes the system requirements for Cisco IOS Release 12.2(2)XA4 and includes the following sections:

- [Memory Recommendations, page 5](#)
- [Headend Interoperability, page 5](#)
- [Supported Hardware, page 5](#)
- [Determining the Software Version, page 6](#)
- [Upgrading to a New Software Release, page 6](#)

- [Feature Set Tables, page 6](#)

Memory Recommendations

[Table 2](#) lists the memory recommendations for each of the feature sets available for the cable voice adapter in Cisco IOS Release 12.2(2)XA4.

Table 2 *Memory Recommendations for the Cisco CVA122 Cable Voice Adapter and Cisco CVA122E Cable Voice Adapter, Release 12.2(2)XA4 Feature Sets*

Feature Set Matrix Term	Image Name	Minimum Flash Memory	Minimum DRAM Memory	Runs From
Base IP Routing + Voice	cva120-k8v4y5-mz	8 MB Flash	16 MB DRAM	RAM

Headend Interoperability

DOCSIS Concatenation

If using DOCSIS concatenation with a 16-QAM ((quadrature amplitude modulation) symbol rate, the CMTS must be configured for Unique Word 16 in the preamble for both short and long data burst profiles. On the Cisco uBR7200 series universal broadband routers, use the **cable modulation-profile** global configuration command and specify “uw16” for both the long and short modulation profiles.

DOCSIS 1.0+ Extensions

The cable voice adapter supports the Cisco DOCSIS 1.0+ Extensions, which include dynamic multi-Service ID (multi-SID) assignment and concatenation. The CMTS must also support the dynamic multi-SID and concatenation features. If you are using the Cisco uBR7200 series headend equipment as the CMTS router, Cisco IOS Release 12.1(1)T or greater is required on the CMTS router to ensure that these features are activated.

To configure the cable voice adapter to support multiple classes of service, use either the Cisco Subscriber Registration Center (CSRC) tool or the configuration file editor of your choice. DOCSIS configuration files can contain multiple classes of service (CoS) to support voice and other real-time traffic. The first CoS is used for data (and voice if no other CoS is defined), and additional classes of service can be defined to give higher priority for voice and other real-time traffic.

Supported Hardware

The Cisco CVA122 Cable Voice Adapter and Cisco CVA122E Cable Voice Adapter contain the following interfaces:

- One F-connector interface to the cable system.
- One 10BASE-T Ethernet RJ-45 port that can be connected to a single computer with an Ethernet network interface card (NIC). If supported by the service provider, the Ethernet interface can also be connected to an Ethernet hub, which then can be connected to additional computers or devices at the site.

- One USB device port to connect a single computer.
- Two RJ-11 voice ports that connect to analog telephones, modems, and fax devices.

Determining the Software Version

To determine the version of Cisco IOS software running on your cable voice adapter, log into the cable voice adapter and enter the **show version EXEC** command:

For the cable voice adapter:

```
cva122# show version
Cisco Internetwork Operating System Software
IOS (tm) 120 Software (cva120-k8v4y5-mz), Version 12.2(2)XA4, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For technical information about upgrading to a new software release, see *Cisco IOS Upgrade Ordering Instructions* on Cisco.com located at:

<http://www.cisco.com/warp/public/620/6.html>

For other information about upgrading to Cisco IOS Release 12.2 T, see the product bulletin *Cisco IOS Software Release 12.2 T Ordering Procedures and Platform Support* on Cisco.com at:

Service & Support: Software Center: Cisco IOS Software: Product Bulletins: Software

Under Cisco IOS 12.2, click on Cisco IOS Software Release 12.2 T Ordering Procedures and Platform Support

Feature Set Tables

Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features.

[Table 3](#) lists the voice and data software images by feature sets for the cable voice adapter. This table uses the following conventions:

- Yes—The feature is supported in the feature set.
- No—The feature is not supported in the feature set.



Note

This table might not be cumulative or list all the features in each image. You can find the most current Cisco IOS documentation on Cisco.com. These electronic documents may contain updates and modifications made after the hardcopy documents were printed. If you have a Cisco.com login account, you can find image and release information regarding features prior to Cisco IOS Release 12.2(2)XA4 by using the Feature Navigator tool at: <http://www.cisco.com/go/fn>.

Table 3 Feature List by Feature Set for the Cisco CVA120 Series Cable Voice Adapter

Features	Base IP Routing Feature Set
Baseline Privacy Interface (BPI) Encryption	Yes
BPI MIB	Yes
Cable Device MIB (RFC 2669)	Yes
Cable Monitor	Yes
Cisco Standard MIBs	Yes
DHCP Proxy Support	Yes
DOCSIS 1.0+ Extensions (Dynamic multi-SID assignment and concatenation)	Yes
DOCSIS-Compliant Bridging (Cisco CVA122 Cable Voice Adapter)	Yes
Easy IP	Yes
EuroDOCSIS-Compliant Bridging (Cisco CVA122E Cable Voice Adapter)	Yes
HSRP ¹ Support for ICMP ² Redirect	Yes
NAT - Support for NetMeeting Directory (Internet Locator Service - ILS)	Yes
Parser Cache	Yes
RFC 2233 Support	Yes
Radio Frequency Interface MIB (RFC 2670)	Yes
Routing (RIP V2)	Yes
Secure Shell (SSH)—56-bit encryption	Yes

1. HSRP = Hot Standby Router Protocol

2. ICMP = Internet Control Message Protocol

New and Changed Information

The following sections list the new hardware and software features supported by the cable voice adapter.

New Hardware Features in Release 12.2(2)XA4

There are no new hardware features supported in Cisco IOS Release 12.2(2)XA4 .

New Software Features in Release 12.2(2)XA4

There are no new software features supported by Release 12.2(2)XA4.

New Hardware Features in Release 12.2(2)XA1

Cisco IOS Release 12.2(2)XA1 supports the Cisco CVA122 Cable Voice Adapter and the Cisco CVA122E Cable Voice Adapter.

New Software Features in Release 12.2(2)XA1

The following new software features are supported by the cable voice adapter for Release 12.2(2)XA1.

Czech Republic and Mexico Country Codes Supported

Cisco IOS Release 12.2(2)XA1 enhances the **cptone** voice-port configuration command with support for the Czech Republic (CZ) and Mexico (MX) country call progress codes.

H.323v2 Protocol

In architectures using the VoIP H.323v2 protocol stack, the session application manages two call legs for each call: a telephony leg managed by the voice telephony service provider, and the VoIP leg managed by the cable system operator—the VoIP service provider. Use of the H.323v2 protocol typically requires a dial plan and mapper at the CVA 120 series cable voice adapter or other server location to map IP addresses to telephone numbers.

When both legs of the call have been set up, the session application creates a conference between them. The opposite leg's transmit routine for voice packets is given to each provider. The CMTS router passes data to the gateway and gatekeeper. The H.323v2 protocol stack provides signaling using H.225 and media negotiation using H.245.

**Note**

For more information on using H.323v2, see the document H.323 Version 2 Support, available on CCO and the Documentation CD-ROM.

To make and receive H.323 calls, the Cisco CVA120 series cable voice adapter must be configured for the following:

- The IP address of the gateway for the destination dialed—In all situations, these IP addresses can be configured statically using the command-line interface (CLI) with `voip dial peer group` commands. If you are using Cisco gatekeeper products that are running Cisco IOS Release 12.0(5)T or higher images, the cable voice adapter can obtain these addresses dynamically from the gatekeeper using the Registration, Admission, and Status (RAS) protocol.
- The telephone numbers of the attached devices—In all situations, these IP addresses can be configured statically using the CLI `pots port` commands. When using Cisco Network Registrar (CNR) version 3.0 or higher, the IP addresses can be configured with the `relay.tcl` and `setrouter.tcl` scripts. If you are using Cisco gatekeeper products that are running Cisco IOS Release 12.0(5)T or higher images, you can obtain these addresses dynamically from CNR. The telephone numbers of attached devices are then sent in DHCP response messages. When the cable voice adapter processes the DHCP response, it automatically creates the `pots dial peer` for each port, creates the `voip dial peer` for the RAS target, and starts the H.323v2 RAS gateway support.

**Note**

To support voice configurations using Cisco gatekeeper products with RAS, Cisco IOS Release 12.0(5)T or higher images with gatekeeper support are required. The headend must have IP multicast enabled. The cable interface must be designated as the default for RAS to discover the gatekeeper. The gatekeeper then resolves all dialed destinations sent to the RAS protocol.

H.323v2 Caller ID

Cisco IOS Release 12.2(2)XA1 adds support for caller ID over H.323v2 VoIP calls, using the **station-id name** and **caller-id enable** voice-port configuration commands. For example, to enable caller ID for voice port 0 on the CVA122, enter the following commands:

```
Router# config t
Router(config)# voice-port 0
Router(voice-port)# station-id name myphonename
Router(voice-port)# caller-id enable
Router(voice-port)# exit
Router(config)#
```



Tips

For more information about these commands, see the *Cisco IOS Voice, Video, and Fax Command Reference, Release 12.2*, available on Cisco.com and the Customer Documentation CD-ROM.

MGCP Including NCS

This feature implements the following MGCP protocols on the Cisco CVA 122 cable voice adapter:

- MGCP 1.0 (RFC2705)
- Network-based Call Signaling (NCS) 1.0, the PacketCable profile of MGCP 1.0 for residential gateways (RGWs)

Media Gateway Control Protocol (MGCP)1.0 is a protocol for the control of Voice over IP (VoIP) calls by external call-control elements known as media gateway controllers (MGCs) or call agents (CAs). It is described in RFC2705.

PacketCable is an industry-wide initiative to develop interoperability standards for multimedia services over cable facilities using packet technology. PacketCable developed the NCS protocol, which contains extensions and modifications to MGCP while preserving basic MGCP architecture and constructs. NCS is designed for use with analog, single-line user equipment on residential gateways.

MGCP Model

MGCP bases its call control and intelligence in centralized call agents, also called media gateway controllers. The call agents issue commands to simple, low-cost endpoints, which are housed in media gateways (MGs), and they also receive event reports from the gateways. MGCP messages between call agents and media gateways are sent over IP/UDP. The messages between CA and gateways can be sent over IP/TCP as well. Typically, IP/UDP is the chosen norm.

The MGCP 1.0 Including NCS 1.0 provides protocols for residential gateways (RGWs), which sit at the border of the packet network to provide an interface between traditional, circuit-based voice services and the packet network. Residential gateways offer a small number of analog line interfaces.

Two basic MGCP constructs are endpoints and connections. An endpoint is a source or sink for call data (RTP/IP) that is flowing through the gateway. A common type of endpoint is found at the physical interface between the POTS or PSTN service and the gateway; this type of endpoint might be an analog voice port or a digital DS0 group. There are other types of endpoints as well, and some are logical rather than physical. An endpoint is identified by a two-part endpoint name that contains the name of the entity on which it exists (for example, an access server or router) and the local name by which it is known (for example, a port identifier).

A connection is a temporary allocation of resources that enables a call to be completed. One or more connections is necessary to complete a call. Connections have names that identify them with the call to which they belong. Connections can be one-to-one or multipoint. Calls and connections are initiated, modified, and deleted on instructions from call agents.

Call agents manage call flow through standard MGCP commands that are sent to the endpoints under their control. The commands are delivered in standard ASCII text, and may contain session descriptions transmitted in Session Description Protocol (SDP), a text-based protocol. These messages are sent over IP/UDP.

Call agents keep track of endpoint and connection status through the gateway's reporting of standard events that are detected from endpoints and connections. Call agents also direct gateways to apply certain standard signals when a POTS/PSTN connection expects them. For example, when someone picks up a telephone handset, an off-hook event is detected on an endpoint on the residential gateway to which the telephone is connected. The gateway reports the event to a call agent, which orders the gateway to apply the dial-tone signal to the endpoint reporting the off-hook event. The person picking up the handset hears dial tone.

Related events and signals are grouped into standard packages that apply to particular types of endpoints. For instance, the off-hook event is found in the line package, which is associated with analog-line endpoints, which in turn are associated with residential gateways.

IP Routing Operations

The Cisco CVA120 series cable voice adapter can be configured for IP routing mode. To operate in routing mode, the Cisco CVA120 series cable voice adapter supports:

- Routing Information Protocol Version 2
- Dynamic Host Configuration Protocol (DHCP) Proxy Support

The DHCP proxy support feature is useful in the following situations:

When the Cisco CVA120 series cable voice adapter is configured for routing mode, an IP address must be assigned to its Ethernet interface. The DHCP proxy support feature allows an external DHCP server to assign an IP address to the Ethernet interface, as opposed to having to assign it manually with the appropriate CLI commands.

When network address translation (NAT) is used, an inside global address pool must be created on the Ethernet interface. The DHCP proxy support feature allows a DHCP server to assign an IP address that automatically creates the NAT address pool, as opposed to manually specifying a static IP address with the appropriate CLI commands.

When configured for DHCP proxy support, during startup the Cisco CVA120 series cable voice adapter sends a proxy DHCP request to the DHCP server using the Ethernet interface's MAC address. The DHCP server replies with a second IP address that the router assigns to either the Ethernet interface or to the NAT pool, depending on which option was specified.

New Hardware Features in Release 12.1(5)XU2

The Cisco CVA 122E cable voice adapter is supported in Cisco IOS Release 12.1(5)XU2.

New Software Features in Release 12.1(5)XU2

The following new software features were introduced in Release 12.1(5)XU and are supported by the cable voice adapter for Release 12.1(5)XU2.

Cable-Modem VoIP Clock-Internal Command

The **cable-modem voip clock-internal** command enables the cable voice adapter's internal clock, allowing it to make VoIP calls over the Ethernet and USB interfaces even when the cable interface is down or disconnected. If the CMTS is a Cisco uBR7200 series router with a Cable Clock Card, this command disables the use of that clock.

Cable Monitor Web Diagnostics Tool

The Cable Monitor is a web-based diagnostic tool to display the current status and configuration of the cable voice adapter. The Cable Monitor can also be used when the cable network is down, providing an easy way for subscribers to provide necessary information to service technicians and troubleshooters.

Cisco Secure Intrusion Detection System (IDS) Support

Cisco IOS Release 12.2(2)XA1 supports the Cisco Secure Intrusion Detection System (IDS), formerly known as Cisco NetRanger, which is composed of three parts:

- A management console (director) that is used to view the alarms as well as to manage the sensors.
- A sensor that monitors traffic. This traffic is matched against a list of known signatures to detect misuse of the network. This is usually in the form of scanning for vulnerabilities or of attacking systems. When a signature is matched, the sensor can track certain actions. In the case of the appliance sensor, it can reset the sessions (using the TCP/rst calls), or enable “shuns” of further traffic. In the case of the IOS-IDS, it can drop traffic. In all cases, the sensor can send alarms to the director.
- Communications through automated report generation of standardized and customizable reports and quality of service (QoS)/CoS monitoring capabilities.

DOCSIS 1.0+ Extensions

In addition to the other QoS features, DOCSIS 1.1 supports several features that are required for the delivery of high-quality voice traffic. To use these features before the DOCSIS 1.1 specification is finalized, Cisco has created the DOCSIS 1.0+ extensions which contain the most important of these features:

- Concatenation—DOCSIS concatenation combines multiple upstream packets into one packet to reduce packet overhead and overall latency, and to increase transmission efficiency. Using concatenation, a DOCSIS cable modem makes only one bandwidth request for multiple packets, as opposed to making a different bandwidth request for each individual packet; this technique is especially effective for bursty real-time traffic, such as voice calls.
- Dynamic Multi-SID Assignment—To give priority to voice traffic, the cable voice adapter assigns a different SID to each voice port. Without the DOCSIS 1.0+ extensions, the cable voice adapter creates these SIDs during the provisioning process, and the SIDs remain in effect until the cable

voice adapter is rebooted with a different configuration. As part of this process, a minimum guaranteed bandwidth is permanently allocated to the voice ports; this bandwidth is reserved to the voice ports even if no calls are being made.

To avoid potentially wasting bandwidth in this manner, the DOCSIS 1.0+ extensions support the dynamic creation of multiple SIDs. New Media Access Control (MAC) messages dynamically add, delete, and modify SIDs when needed. When a phone is taken off-hook, the cable voice adapter creates a SID that has the QoS parameters needed for that particular voice call. When the call terminates, the cable voice adapter deletes the SID, releasing its bandwidth for use elsewhere.

**Note**

Both the cable voice adapter and the CMTS must support the dynamic multi-SID and concatenation features for them to be used on the cable network. If you are using the Cisco uBR7200 series universal broadband router as the CMTS, Cisco IOS Release 12.1(1)T (or later) is required on the Cisco uBR7200 series routers to use these features.

DOCSIS Baseline Privacy Interface (BPI)

The DOCSIS Baseline Privacy Interface (BPI) feature is based on the DOCSIS BPI Specification (SP-BPI-I02-990319 or later revision). It provides data privacy across the HFC network by encrypting traffic flows between the cable voice adapter and the cable operator's CMTS.

The BPI+ (BPI Plus) feature is an enhancement to the BPI feature and is based on the DOCSIS BPI+ Specification (SP-BPI+-I04-000407 or later revision), which is still in development. In addition to the regular BPI features, BPI+ provides more secure authentication of cable modems through the use of digital certificates. Also, a cable modem can use a digital signature to verify that the software image it has downloaded has not been altered or corrupted in transit. The Cisco CVA120 Series Cable Voice Adapter contains the digital certificates required for BPI+ operation. However, BPI+ support will not be available until DOCSIS 1.1 is supported in a later release of Cisco IOS software.

**Note**

Cisco IOS Release 12.2(2)XA1 supports BPI encryption but not BPI+ encryption. The CMTS and cable voice adapter must both support and enable BPI to use its features.

DOCSIS Baseline Privacy Management Information Base

The Baseline Privacy Management Information Base, as currently defined, is available in Cisco IOS Release 12.2(2)XA1 code. BPI allows a Simple Network Management Protocol (SNMP) manager to monitor and manage the cable voice adapter's BPI configuration, including whether BPI is enabled, status of current authorization keys, current timeout values, real-time status counters, and additional information about authorization errors.

**Note**

The SNMP manager must load the DOCSIS-BPI-MIB.my MIB to access the BPI attributes. See the [“Cable-Specific MIBs” section on page 18](#) for details.

Dynamic Host Configuration Protocol (DHCP) Proxy Support

The DHCP Proxy Support feature helps to automate the configuration of the cable voice adapter in two situations:

- When the cable voice adapter is configured for routing mode, an IP address must be assigned to its Ethernet interface. The DHCP Proxy Support feature allows an external DHCP server to assign an IP address to the Ethernet interface, as opposed to having to assign it manually with the appropriate command-line interface (CLI) commands.
- When network address translation (NAT) is used, an inside global address pool must be created on the Ethernet interface. The DHCP Proxy Support feature allows a DHCP server to assign an IP address that automatically creates the NAT address pool, as opposed to manually specifying a static IP address with the appropriate CLI commands.

When configured for DHCP Proxy Support, during startup the cable voice adapter sends a proxy DHCP request to the DHCP server using the Ethernet interface's MAC address. The DHCP server replies with a second IP address that the cable voice adapter assigns to either the Ethernet interface or to the NAT pool, depending on which option was specified.

Easy IP—DHCP Server and NAT/PAT

The Easy IP feature set includes the following features to automate the assignment and use of IP addresses:

- The DHCP server feature on the cable voice adapter includes both Intelligent DHCP Relay and DHCP Client functionality. A DHCP Relay Agent is any host that forwards DHCP packets between clients and servers—this enables the client and server to reside on separate subnets. If the cable voice adapter DHCP server cannot satisfy a DHCP request from its own database, it can also act as a DHCP proxy agent by forwarding the DHCP request to one or more secondary DHCP servers.
- Network address translation (NAT) and port address translation (PAT) frees a private network from needing a worldwide unique IP address for every computer connected to the Internet. Instead, the cable voice adapter translates the IP addresses used on the private network into a global IP address that can be used on the Internet. One IP address can be used for multiple computers because a unique port address identifies the individual computers on the private network.



Note NAT and PAT are defined in Requests for Comments (RFC) 1631.

Enhanced Bridging

The cable voice adapter contains a 10BASE-T Ethernet hub port, which can be connected to a single computer directly or to an Ethernet hub. The Ethernet hub connects additional computers or devices at the site. The Cisco CVA120 Series Cable Voice Adapter also supports enhanced bridging to the PC connected to its USB interface. A maximum of 254 devices can be bridged in DOCSIS/EuroDOCSIS bridging mode; no limit exists in routing mode.

Full and DOCSIS/EuroDOCSIS-Compliant Bridging

DOCSIS/EuroDOCSIS-compliant bridging allows the cable voice adapter to operate as a DOCSIS/EuroDOCSIS 1.0 cable modem, so that it can interoperate with any DOCSIS/EuroDOCSIS-qualified CMTS. DOCSIS-compliant bridging is the default mode of operation for the Cisco CVA122 Cable Voice Adapter, and EuroDOCSIS-compliant bridging is the default mode of operation for the Cisco CVA122E Cable Voice Adapter.

IP Address DOCSIS Command

The **ip address docsis** interface configuration command configures the cable voice adapter so that it obtains its IP address from a DHCP server at system power-on, which is a requirement for DOCSIS operation. The **ip address docsis** command can be specified only for the cable interface, and no other **ip address** interface configuration commands are allowed for the cable interface.



Note

This change is cosmetic only and does not change how the cable voice adapter obtains its IP address.

Management Information Base (MIB) Features

Cisco IOS Release 12.1(5)XU1 supports the following types of MIBs:

- Baseline Privacy Interface (BPI) MIBs
- Cable Device MIBs
- Cisco Standard MIBs
- Radio Frequency Interface MIBs

NAT—Support for NetMeeting Directory (Internet Locator Service—ILS)

Microsoft NetMeeting is a Windows-based application that enables multiuser interaction and collaboration from a user's PC over the Internet or an intranet. Support for the NetMeeting Directory (ILS) allows connections by name from the directory built into the NetMeeting application. Destination IP addresses do not need to be known in order for a connection to be made.

Parser Cache

The Parser Cache feature optimizes the parsing (translation) of Cisco IOS software configuration command lines by remembering how to parse recently encountered command lines. This feature was developed to improve the scalability of the Cisco IOS software CLI parser when processing large configuration files. This improvement is especially useful for those cases in which thousands of virtual circuits must be configured for interfaces, or hundreds of access control lists (ACLs) are required. The parser chain cache can rapidly recognize and translate configuration lines that differ slightly from previously used configuration lines (for example, pvc 0/100, pvc 0/101, and so on). Testing indicates an improvement to load time of between 30% and 36% for large configuration files when using the parser cache.

A new global configuration command, **[no] parser cache**, allows the disabling or reenabling of parser cache.

RFC 2233 Support

Cisco IOS Release 12.2(2)XA1 supports RFC 2233 for the IF-MIB MIB, with the “ifCounterDiscontinuityTime” attribute and the “ifTableLastChange” attribute.

In addition, this feature supports RFC 2233-compliant link-up and link-down traps. By default, link-up and link-down traps are implemented as given in the CISCO-IF-CAPABILITY.mib MIB. To generate link-up and link-down traps as defined by RFC 2233, use the **snmp-server trap link ietf** global configuration command.

RFC 2669 and RFC 2670 Support

RFC 2669 and RFC 2670 are supported on the DOCS-CABLE-DEVICE-MIB and DOCS-IF-MIB MIBs, respectively.

Routing (RIP V2)

When configured for routing mode, the cable voice adapter supports the Routing Information Protocol Version 2 (RIPv2). In routing mode, the cable voice adapter automatically configures itself to use the headend’s IP address as its IP default gateway. This allows the cable voice adapter to send packets not intended for the private LAN to the headend for delivery to the Internet and other networks.



Note

The cable voice adapter supports only static routes and the RIP routing protocol.

Secure Shell Version 1 Client Support

Secure Shell (SSH) provides for authentication and encryption at the application layer, providing a secure connection even when BPI or IPsec authentication and encryption are not used at the network layer. By default, the SSH feature uses 56-bit DES encryption.

In Cisco IOS Release 12.2(2)XA1, SSH support includes the following features:

- SSH server support allows users to use an SSH connection to log in to the cable voice adapter.
- SSH client support allows a user logged in to the cable voice adapter to log in to another router using SSH authentication and encryption.
- 56-bit DES encryption is supported.
- RSA authentication. (RSA stands for Rivest, Shamir, and Adelman, inventors of a public-key cryptographic system.)



Note

For configuration and other information, see the *Secure Shell Version 1 Integrated Client* feature module, available on Cisco.com and the Documentation CD-ROM.

MIBs

Current MIBs

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB web site on Cisco.com at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

Supported MIBs

The cable voice adapter supports the following categories of MIBs:

- Cable device MIBs—These MIBs are for DOCSIS-compliant cable modems and CMTS to record statistics related to the configuration and status of the cable modem. These MIBs include support for the MIB attributes defined in RFC 2669.
- Cisco’s standard MIBs—These MIBs are common across most of Cisco’s router platforms. If your network management applications are already configured to support other Cisco routers, such as the Cisco 2600 series or Cisco 7200 series, no further configuration is needed unless the version of Cisco IOS software being used has updated these MIBs.
- Radio Frequency Interface MIBs—These MIBs are for DOCSIS-compliant radio frequency interfaces in cable modems and CMTS. This MIB includes support for the MIB attributes defined in RFC 2670.
- SNMP standard MIBs—These are the MIBs required by any agent supporting SNMPv1 or SNMPv2 network management.
- Cable-specific MIBs—These MIBs provide information about the cable interface and related information on the cable voice adapter. They include both DOCSIS-required MIBs and Cisco-specific enterprise MIBs. If your network management applications have not already been configured for the cable voice adapter, these MIBs must be loaded.
- Deprecated MIBs—These MIBs were supported in earlier releases of Cisco IOS software but have been replaced by more standardized, scalable MIBs. Network Management applications and scripts should convert to the replacement MIBs as soon as possible.

Cable Device MIBs

The cable voice adapter supports the Cable Device MIB, which is defined by RFC 2669 and describes DOCSIS-compliant cable modems and CMTS. The Cable Device MIB records statistics related to the configuration and status of the cable modem. Statistics include an events log and device status. The following list details the components of the Cable Device MIB:

- “docsDevBase” group extends the MIB-II “system” group with objects needed for cable device system management
- “docsDevNmAccess” group provides a minimum level of SNMP access security
- “docsDevSoftware” group provides information for network downloadable software upgrades
- “docsDevServer” group provides information about the progress of interaction with various provisioning servers

- “docsDevEven” group provides information about the progress of reporting
- “docsDevFilter” group configures filters at link layer and IP layer for bridge data traffic

The Cable Device MIB is very similar to the RFI MIB in that both allow access to statistics; they are different in that the Cable Device MIB reports statistics on the cable modem, and the RFI MIB reports statistics on the radio frequency transmissions over the cable television line.

Cisco Standard MIBs

The cable voice adapter supports the Cisco Standard MIBs, which consist of the following components:

- CISCO-PRODUCT-MIB
- CISCO-SYSLOG-MIB
- CISCO-FLASH-MIB
- BRIDGE-MIB
- IF-MIB (RFC 2233)
- CiscoWorks/CiscoView support
- SNMP standard MIBs—These are the MIBs required by any agent supporting SNMPv1 or SNMPv2 network management



Note

The *Cisco Management Information Base (MIB) User Quick Reference* publication is no longer published. For the latest list of MIBs supported by Cisco, see the *Cisco Network Management Toolkit* on Cisco.com. From the Cisco.com home page, click on this path: **Service & Support: Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**

Cisco Voice MIBs

The Cisco CVA 120 series cable voice adapter supports the Cisco Voice MIBs, which consist of the following components:

- CISCO-VOICE-DIAL-CONTROL-MIB
- CISCO-VOICE-ANALOG-IF-MIB
- CISCO-VOICE-IF-MIB

Uninterruptible Power Supply (UPS) and Power MIBs

These MIBs describe the Cisco CVA120 Series Cable Voice Adapter’s onboard environmental monitor, which includes information about the status of the UPS and the power supply. The power and UPS attributes are described in the table, “ciscoEnvMonSupplyStatusTable.” To send a trap or interrupt request whenever the cable voice adapter switches between its onboard AC power supply and the UPS, set the “ciscoEnvMonEnableRedundantSupplyNotification” attribute to “true” to enable the “ciscoEnvMonRedundantSupplyNotification” trap.

Radio Frequency Interface MIBs

The cable voice adapter supports the Radio Frequency Interface (RFI) MIB. The RFI MIB module is defined in RFC 2670 and describes DOCSIS-compliant radio frequency interfaces in cable modems and CMTS. On the cable modem, RFI MIB entries provide:

- Upstream and downstream channel characteristics
- Class of service attributes
- Physical signal quality of the downstream channels
- Attributes of cable voice adapter MAC interface
- Status of several MAC layer counters

The RFI MIB includes tables describing both the CMTS and the cable modem side of the cable interface. All cable modem tables are implemented.

Cable-Specific MIBs

Table 4 shows the cable-specific MIBs that are supported on the cable voice adapter. This table also provides a brief description of each MIB's contents and the Cisco IOS software release in which the MIB was initially functional—earlier releases might have had unsupported prototype versions of the MIB; later releases might have added new attributes and functionality.



Note

The names given in Table 4 are the filenames for the MIBs as they exist on Cisco's FTP site (<ftp://ftp.cisco.com/pub/mibs/> or <http://www.cisco.com/public/mibs/>). Most MIBs are available in both SNMPv1 and SNMPv2 versions; the SNMPv1 versions have *V1SMI* as part of their filenames. Also see the Cisco MIBs home page at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

Table 4 Supported MIBs for the Cisco CVA120 Series Cable Voice Adapter

MIB Filename	Description	Release
SNMPv2-SMI.my SNMPv2-SMI-V1SMI.my	This module specifies the Structure of Management Information (SMI) for SNMPv2, as defined in RFC 1902.	12.1(5)XU2
SNMPv2-TC.my SNMPv2-TC-V1SMI.my	This module defines the textual conventions as specified in pages 4, 10-11 of RFC 854.	12.1(5)XU2
CISCO-SMI.my CISCO-SMI-V1SMI.my	This module specifies the SMI for Cisco's enterprise MIBs.	12.1(5)XU2
CISCO-TC.my CISCO-TC-V1SMI.my	This module defines the textual conventions used in Cisco's enterprise MIBs.	12.1(5)XU2
IF-MIB.my IF-MIB-V1SMI.my	This module describes generic objects for the Layer 3 network interface sublayers. This MIB is an updated version of MIB-II's <i>if</i> table, and incorporates the extensions defined in RFC 2233.	12.1(5)XU2
CISCO-CABLE-SPECTRUM-MIB.my CISCO-CABLE-SPECTRUM-MIB-V1SMI.my	This module describes the spectrum management flap list attributes.	12.1(5)XU2
DOCS-IF-MIB.my DOCS-IF-MIB-V1SMI.my	This module describes the DOCSIS-compliant Radio Frequency (RF) interfaces in cable modems and cable modem termination systems, as described in RFC 2670.	12.1(5)XU2

Table 4 Supported MIBs for the Cisco CVA120 Series Cable Voice Adapter (continued)

MIB Filename	Description	Release
DOCS-BPI-MIB.my DOCS-BPI-MIB-V1SMI.my	This module describes the attributes for the DOCSIS-specified Baseline Privacy Interface (BPI) on cable modems and the CMTS.	12.1(5)XU2
CISCO-DOCS-EXT-MIB.my CISCO-DOCS-EXT-MIB-V1SMI.my	This module extends the DOCSIS standard RFI MIB (DOCS-IF-MIB) with Cisco-specific extensions, such as Quality of Service (QoS) attributes and connection status and other information regarding the cable modems and CPE devices supported by the CMTS. Note This MIB contains information about both the CMTS and CM, but it is supported only on the CMTS. If you are using the same manager for both CM and CMTS SNMP access, you must load this MIB in the order shown.	—
DOCS-CABLE-DEVICE-MIB.my DOCS-CABLE-DEVICE-MIB-V1SMI.my	This module was previously known as the CABLE-DEVICE-MIB and contains cable-related objects for DOCSIS-compliant cable modems, as specified in RFC 2669.	12.1(5)XU2
USB-MIB.my	This module describes the cable voice adapter's Universal Serial Bus (USB) interface. It is based on an IETF draft (draft-dolnik-usb-mib-02.txt), which is available on the IETF web site at http://www.ietf.org/index.html , in the "Internet Drafts" section.	12.1(5)XU2

**Note**

Because of interdependencies, the MIBs must be loaded in the order given in the table.

Deprecated MIBs

A number of Cisco-provided MIBs have been replaced with more scalable, standardized MIBs; these MIBs have filenames that start with "OLD" and first appeared in Cisco IOS Release 10.2. The functionality of these MIBs has already been incorporated into replacement MIBs, but the old MIBs are still present to support existing Cisco IOS products or network management system (NMS) applications. However, because the deprecated MIBs will be removed from support in the future, you should update your network management applications and scripts to refer to the table names and attributes that are found in the replacement MIBs.

Table 5 shows the deprecated MIBs and their replacements. In most cases, SNMPv1 and SNMPv2 replacements are available, but some MIBs are available only in one version. A few of the deprecated MIBs do not have replacement MIBs; support for these MIBs will be discontinued in a future release of Cisco IOS software.

Table 5 Replacements for Deprecated MIBs

Deprecated MIB	Replacement MIBs	
	SNMPv1 MIB	SNMPv2 MIB
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB	—
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB-V1SMI	ENTITY-MIB
OLD-CISCO-CPU-MIB	—	CISCO-PROCESS-MIB
OLD-CISCO-DECNET-MIB	—	—
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB-V1SMI	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB-V1SMI	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB-V1SMI	IF-MIB
	CISCO-QUEUE-MIB-V1SMI	CISCO-QUEUE-MIB
OLD-CISCO-IP-MIB	—	—
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB-V1SMI	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB	—
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBS)	
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB-V1SMI	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB-V1SMI	CISCO-TCP-MIB
OLD-CISCO-TS-MIB	—	—
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB-V1SMI	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	—	—



Note

Some of the MIBs listed in [Table 5](#) represent feature sets that are not supported on the cable voice adapter.

Limitations and Restrictions

This section describes warnings and cautions about using Cisco IOS Release 12.2(2)XA4 software.

Bridging Support

The cable voice adapter interoperates with DOCSIS/EuroDOCSIS cable networks. Cisco IOS Release 12.2(2)XA4 does not support bridging traffic across a non-DOCSIS cable network.

DOCSIS CLI Commands are Removed

To comply with DOCSIS requirements that restrict access to commands that change DOCSIS parameters, Cisco IOS Release 12.1(2)T removed a number of commands from the CLI.

The following commands are now reserved exclusively for DOCSIS use:

- [no] **cable-modem downstream saved channel**
- [no] **cable-modem fast-search**
- [no] **cable-modem downstream symbol rate**
- [no] **cable-modem transmit-power**
- [no] **cable-modem upstream preamble qpsk**

IP Address Negotiation

The DOCSIS specifications require that a cable modem obtain its IP address at power-on or reset from a DHCP server that is available through the cable interface. For this reason, the cable voice adapter defaults to a configuration that uses the **ip address docsis** command for the cable interface. It is not possible to override this setting by specifying a specific static IP address; to assign a static IP address to the cable voice adapter, configure the DHCP server so that it assigns the desired IP address on the basis of the unit's MAC address. However, service providers should warn subscribers that changes in the cable network's topology—whether due to traffic levels, growth, or changes to the cable plant and other hardware—might still require changing the subnets and IP addresses assigned to a particular cable modem.



Note

The **ip address negotiated** and **ip address dhcp** commands cannot be used on the cable interface.

Three-Way Calling

Three-way calling services are limited to using only the G.711 codec voice algorithms. Attempts to connect a call using a high complexity algorithm, such as G.729, will result in blocked calls.

Using Access Lists

Avoid manually configuring access lists 100, 101, and 102 on the cable voice adapter. Configuring these access lists, either by using the CLI or an Cisco IOS configuration file, can cause the router to reload. Use access lists 103 through 109 instead for those configurations that require access lists.

This situation occurs when the DOCSIS “docsDevNmAccessEntry” table is filled at initial provisioning with the network management stations that are allowed SNMP access. The router automatically uses access lists 100, 101, and 102 for the cable, Ethernet, and USB interfaces to control this access. See the description of caveats [CSCdr45850](#) and [CSCdr46128](#) for more information.

Using Multiple PCs with the Cisco CVA120 Series Adapter

The “MAX CPE” parameter in a cable voice adapter’s DOCSIS configuration file determines how many PCs (or other CPE devices) are supported by the cable voice adapter. The default value for the “MAX CPE” parameter is 1, which means only one PC can be connected to the cable voice adapter.

The DOCSIS 1.0 specification states that a CMTS cannot age-out MAC addresses for CPE devices, so the first PC that is connected to the cable voice adapter is normally the only one that the CMTS recognizes as valid. If a subscriber replaces an existing PC or changes its network interface card (NIC) to one that has a different MAC address, the CMTS will refuse to let the PC come online because this would exceed the maximum number of CPE devices specified by the “MAX CPE” parameter. A similar thing would happen if a user decides to move a PC from one cable voice adapter to another.

To allow a subscriber to replace an existing PC or NIC, the following workarounds are possible:

- If using a Cisco uBR7200 series router as the CMTS, enter the **clear cable host MAC address** command on the Cisco uBR7200 series router to remove the PC’s MAC address from the router’s internal address tables. The new PC will be rediscovered and associated with the correct cable voice adapter during the next DHCP lease cycle.
- Increase the value of the “MAX CPE” parameter in the cable voice adapter’s DOCSIS configuration file so that it can accommodate the desired number of PCs. Reset the cable voice adapter to force it to load the new configuration file.

Important Notes

This section contains important information about using Cisco IOS Release 12.2(2)XA4 software.

Limitation on Vendor-Specific Information in the DOCSIS Configuration File

DOCSIS requires that when the cable modem sends its Registration Request (REG-REQ) message to the CMTS, it must include the configuration information found in the DOCSIS configuration file. This configuration information must include all vendor-specific information fields (VSIF). Because MAC-layer management messages, such as REG-REQ, have a maximum data size of 1522 bytes, this limits the amount of VSIF information that can be included in the DOCSIS configuration file.

In particular, the maximum packet size imposes a limit on the number of Cisco IOS CLI commands you can include as VSIF fields in the DOCSIS configuration file. The exact number of commands that will fit depends on the other information included in the file, as well as the length of each command.

If the REG-REQ message is larger than 1522 bytes, the cable modem will likely report errors similar to the following errors that appears on Cisco uBR900 series cable access routers:

```
%LINK-4-TOOBIG: Interface cable-modem0, Output packet size of 1545 bytes too big
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to down
```

In addition, the CMTS will also report that the cable modem timed out during the registration process. If this occurs, you can try the following steps:

- Reduce the length of the commands by using the abbreviated form of the command. For example, you can specify the **int c0** instead of the full command **interface cable-modem0**.
- SNMP MIB objects are not included in the Registration Request message, so wherever possible, replace the CLI commands with the corresponding SNMP MIB object statements in the DOCSIS configuration file.

- If a large number of CLI commands must be given, use VSIF option 128 to download a Cisco IOS configuration file to the cable modem.

For complete details on what is included in the REG-REQ message, see Chapter 6 of the current DOCSIS 1.1 specification (SP-RFIV1.1-I07-010829 or later).



Note

This limitation is being tracked by caveat CSCdv83892 but is not expected to be resolved unless the DOCSIS specification is changed to remove the maximum size limit for MAC-layer management messages.

Changing the Default Password

The cable voice adapter is shipped with a default password stored in its Flash memory. The service provider should change this password to prevent unauthorized access. This can be done by including a new encrypted password in the Cisco IOS configuration file that is downloaded to the cable voice adapter during the registration process. The service provider can also remove the password altogether.

However, not specifying a password will disable telnet access to the cable voice adapter. In this situation, the only way to remotely configure the cable voice adapter is through SNMP or by reinitializing the unit and uploading a new Cisco IOS configuration file to it during the registration process. If these two options are not available, the cable voice adapter will not be remotely configurable and will have to be returned to the service provider for additional configuration.

CPE Device Filtering

For the cable voice adapter, the “docsDevCpeIpMax” attribute defaults to -1. This attribute controls the maximum number of CPE devices that can pass traffic through the cable voice adapter from its Ethernet interface as follows:

- When “docsDevCpeIpMax” is set to -1, the cable voice adapter does not filter any IP packets on the basis of their IP addresses, and CPE IP addresses are not added to the “docsDevFilterCpeTable” table.
- When “docsDevCpeIpMax” is set to 0, the cable voice adapter does not filter IP packets on the basis of the IP addresses. However, the source IP addresses are still entered into the docsDevFilterCpeTable table.
- When “docsDevCpeIpMax” is set to a positive integer, it specifies the maximum number of IP addresses that can be entered into the “docsDevFilterCpeTable” table. The cable voice adapter compares the source IP address for packets it receives from CPE devices to the addresses in this table. If a match is found, the packet is processed; otherwise, the packet is dropped.

CPE IP address filtering is done as part of the following process:

1. MAC address filtering—Packets are filtered on the basis of the CPE device’s MAC address. This is controlled by the value of the “MAX CPE” parameter, which is set in the DOCSIS configuration file.
2. Link Level Control (LLC) filtering—Packets are filtered on the basis of the packet’s protocol. This is controlled by the “docsDevFilterLLCTable” table.
3. CPE IP address filtering—Packets are filtered on the basis of the CPE device’s IP address, as controlled by the “docsDevCpeIpMax” attribute and “docsDevFilterCpeTable” table.

4. Access list filtering—Packets are filtered on the basis of access lists. IP filtering is controlled by the “docsDevFilterIpTable” table, and SNMP access filters are controlled by the “docsDevNmAccessTable” table.

See the DOCS-CABLE-DEVICE-MIB.my MIB for more information on the attributes and tables listed above.

Disabling the Finger Server

By default, the cable voice adapter enables its onboard TCP/IP “finger” server to allow remote users to query the number and identities of any users who are logged in to the cable voice adapter. Unless your network operations center (NOC) requires this service, it should be disabled to prevent denial of service attacks that access the finger server’s well-known port (TCP port 79). To disable the finger server, include the **no service finger** command in the Cisco IOS configuration file that the cable voice adapter downloads at initial power-on.

Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. Severity 3 caveats are moderate caveats.

This section contains open and resolved caveats for Cisco IOS Release 12.2(2)XA4. All caveats in Release 12.2 T are also in Release 12.2(2)XA4.

For information on caveats in Cisco IOS Release 12.2 T, see *Caveats for Cisco IOS Release 12.2 T*, which lists severity 1 and 2 caveats and selected severity 3 caveats, and is located on Cisco.com and the Documentation CD-ROM.

Caveat numbers and brief descriptions for Release 12.2(2)XA are listed in [Table 8](#) and [Table 9](#). For details about a particular caveat, go to Bug Toolkit at:

<http://www.cisco.com/cgi-bin/Support/Bugtool/onebug.pl?bugid=CSCdw67458>

To access this location, you must have an account on Cisco.com. For information about how to obtain an account, go to the [“Feature Navigator” section on page 29](#).



Note

If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, go to Cisco.com and press **Login**. Then go to **Software Center: Cisco IOS Software: Cisco Bugtool Navigator II**.



Note

This document lists the caveats that were known at the time of publication. The Bug Navigator II site has the most current information about any caveat. Also, this document may be updated as needed with any new information about caveats; the most current version is always posted on Cisco.com.

Resolved Caveats—Release 12.2(2)XA5

All caveats in this section have been resolved in Cisco IOS Release 12.2(2)XA5 but may be open in previous Cisco IOS releases.

- CSCdw65903

An error can occur with management protocol processing. Please use the following URL for further information:

<http://www.cisco.com/cgi-bin/Support/Bugtool/onebug.pl?bugid=CSCdw67458>

Open Caveats—Release 12.2(2)XA4

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)XA4, and describes only severity 1 and 2 caveats and select severity 3 caveats.

Table 6 Open Caveats for Release 12.2(2)XA4

Caveat ID Number	Description
CSCdv87298	DTMF Digit Detection Failed to Meeting Specification

Closed or Resolved Caveats—Release 12.2(2)XA4

Table 7 Closed or Resolved Caveats for Release 12.2(2)XA4

Caveat ID Number	Description
CSCdv13906	terminating GK crashes under stress
CSCdv20012	Memleak on intermediate GK/BE when forwarding LRQ
CSCdv27522	H323 GK Crash when LCF with tokens recd while forwarding LRQ
CSCdv49020	Memleak on intermediate GK/BE when forwarding LRQ
CSCdv64609	Memleak on BE when handling forwarded LRQ
CSCdv66453	Stress memleak on intermediate GK/BE

Open Caveats—Release 12.2(2)XA

This section documents possible unexpected behavior by Cisco IOS Release 12.2(2)XA, and describes only severity 1 and 2 caveats and select severity 3 caveats.

Table 8 Open Caveats for Release 12.2(2)XA

Caveat ID Number	Description
CSCdr48095	SNMP Copy with erase to bootflash erases flash
CSCds17134	Slow SNMP Memory leak, not docsis specific
CSCdu27827	CM CMAC_LOG_OUTPUT_STUCK when CMTS clear IP route *
CSCdu32179	firewall dest inspec not working
CSCdu46795	MAC-14_ECW4: Mib sets in docsis config file ignored if upgrade fails
CSCdu48008	CMAC Control process memory leak w/ c0 interface reset
CSCdu50598	ubr925: If BPI ena, fails to get TOD and read config file on restart
CSCdu52744	DOCSIS11: Spurious mem access due to Error setting US attenuation

Table 8 Open Caveats for Release 12.2(2)XA (continued)

Caveat ID Number	Description
CSCdu53875	CM tracebacks & E0 Flap when CMTS shut/noshut or cable modem reset
CSCdu55064	DOCSIS11: Spurious mem access made when sending traffic of 1500 bytes
CSCdu56484	UBR925: SEGV is USB code
CSCdu58936	ubr905 shipped units fail DPM

Closed or Resolved Caveats—Release 12.2(2)XA

Table 9 Closed or Resolved Caveats for Release 12.2(2)XA

Caveat ID Number	Description
CSCdt01374	Display the version number of the USB driver running on the PC
CSCdt43223	MAX-CPE parameter in the DOCSIS configuration file
CSCdu01820	MGCP: After embedded RQNT is sent next call did not get dial tone

Open Caveats—Release 12.1(5)XU2

This section documents possible unexpected behavior by Cisco IOS Release 12.1(5)XU2, and describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdr28707

The **show interface** command can show an impossible number of CRC errors on the cable interface when transmitting VoIP traffic. When this error occurs, the number of CRC errors typically exceeds a billion errors and is greater than the total number of packets transmitted on the interface. The workaround is to use the **show interface cable 0 counters** command to display the correct number of errors.

- CSCdr45850 and CSCdr46128

The cable voice adapter might reload when using an access list numbered 100, 101, or 102 while running Cisco IOS Release 12.1 XU1 images that support any form of IPSec encryption. Other access lists, however, can be used without problem.

The workaround is to not configure access list numbers 100, 101, and 102 for any purpose. Use access lists 103 through 199 instead.

- CSCdr77182

The cable voice adapter can eventually crash with “out of memory” errors after making several thousand phone calls if the configuration includes the **req-qos controlled-load dial-peer** configuration command. The workaround is to remove the **req-qos controlled-load dial-peer** configuration command.

Closed or Resolved Caveats—Release 12.1(5)XU2

All the caveats listed in this section are resolved in Cisco IOS Release 12.1(5)XU2. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdm75295

The cable voice adapter can stop responding to CMTS requests when upstreams are configured with different minislot sizes. The workaround is to configure the upstreams on the CMTS with the same minislot size.

This caveat was closed because it does not occur with the hardware that is used on production units of the cable voice adapter.

- CSCdr76711

Upstream performance for data traffic on a DOCSIS 1.0 cable modem is limited to approximately 1.7 megabits per second, due to the limits of using one SID for data traffic, as required by the DOCSIS 1.0 specification. This caveat cannot be resolved until the implementation of the DOCSIS 1.1 specification, which provides for multiple SIDs for data traffic. There is no workaround.

This caveat was closed because it is a result of the design of the DOCSIS 1.0 specification and can be improved only when the DOCSIS 1.1 specification is implemented.

- CSCdt20090

The DOCSIS specification requires that when a DOCSIS cable modem is attached to a cable network, it must search the downstream channel for an available frequency. The Cisco CVA122 cable voice adapter starts its downstream frequency scan with the United States channel plan, and if that fails, it uses the European channel plan. If this fails, the cable voice adapter then begins an exhaustive search of all available DOCSIS downstream frequencies.

However, the Cisco CVA122 cable voice adapter did not scan all of the frequencies in the European channel plan, so when it is used on a plant using the Eurochannel plan, it can take a significantly longer time before the cable voice adapter discovers the correct frequency. There is no workaround.

This caveat is resolved in Cisco IOS Release 12.1(5)XU1.

- CSCdr91706 and Cisco IOS HTTP Vulnerability

A defect in multiple releases of Cisco IOS software will cause a Cisco router or switch to halt and reload if the Cisco IOS HTTP service is enabled, browsing to [http://router-ip/anytext/?/](http://router-ip/anytext?/) is attempted, and the enable password is supplied when requested. This defect can be exploited to produce a denial of service (DoS) attack.

The vulnerability, identified as Cisco bug ID CSCdr91706, affects virtually all mainstream Cisco routers and switches running Cisco IOS software releases 12.0 through 12.1, inclusive. This is not the same defect as CSCdr36952.

The vulnerability has been corrected and Cisco is making fixed releases available for free to replace all affected Cisco IOS releases. Customers are urged to upgrade to releases that are not vulnerable to this defect, as shown in detail below.

This vulnerability can be exploited only if the enable password is known or not set.

You are strongly encouraged to read the complete advisory, which is available at <http://www.cisco.com/warp/public/707/ioshttpserverquery-pub.shtml>

This caveat does not affect Cisco IOS Release 12.2(2)XA4.

- CSCds04747

Connection setup improvements.

This caveat is resolved in Cisco IOS Release 12.1(5)XU1.

Related Documentation

The following sections describe the documentation available for the cable voice adapter. These documents consist of hardware and software installation guides, Cisco IOS configuration guides and command references, system error messages, feature modules, and other documents.

Most documentation is available as printed manuals or electronic documents, except for feature modules and select manuals, which are available online on Cisco.com and the Documentation CD-ROM.

Use these release notes with these documents:

- [Release-Specific Documents, page 28](#)
- [Platform-Specific Documents, page 29](#)
- [Feature Modules, page 29](#)
- [Feature Navigator, page 29](#)
- [Cisco IOS Software Documentation Set Contents, page 30](#)

Release-Specific Documents

The following documents are specific to Release 12.2 and are located on Cisco.com and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.2*

On Cisco.com at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: Cross-Platform Release Notes

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: Cross-Platform Release Notes

- Product bulletins, field notices, and other release-specific documents on Cisco.com at:

Technical Documents

- *Caveats for Cisco IOS Release 12.2 T*

As a supplement to the caveats listed in these release notes, see *Caveats for Cisco IOS Release 12.2*, which contains caveats applicable to all platforms for all maintenance releases of Release 12.2.

On Cisco.com at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Release Notes: Caveats

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS 12.2: Caveats



Note

If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, go to Cisco.com and press **Login**. Then go to **Software Center: Cisco IOS Software: Cisco Bugtool Navigator II**.

Platform-Specific Documents

These documents are available for the cable voice adapter on Cisco.com and the Documentation CD-ROM:

- *Cisco CVA122 Cable Voice Adapter User Guide*
- *Cisco CVA122 Cable Voice Adapter Hardware Installation Guide*
- *Cisco CVA122 Cable Voice Adapter Features*
- *Cisco CVA122 Cable Voice Adapter Subscriber Setup Quick Start Card*
- *DOCSIS CPE Configurator Help*

On Cisco.com at:

Technical Documents: Documentation Home Page: Cisco Product Documentation: Broadband/Cable Solutions: Cisco CVA120 Series Cable Voice Adapters

On the Documentation CD-ROM at:

Cisco Product Documentation: Broadband/Cable Solutions: Cisco CVA120 Series Cable Voice Adapters

Feature Modules

Feature modules describe new features supported by Release 12.2, and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, and configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On Cisco.com at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: New Feature Documentation

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2: New Feature Documentation

Feature Navigator

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a particular set of features and which features are supported in a particular Cisco IOS image.

Feature Navigator is available 24 hours a day, 7 days a week. To access Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, e-mail the Contact Database Administration group at cdbadmin@cisco.com. If you do not have an account on Cisco.com, go to <http://www.cisco.com/register> and follow the directions to establish an account.

To use Feature Navigator, you must have a JavaScript-enabled web browser such as Netscape 3.0 or later, or Internet Explorer 4.0 or later. Internet Explorer 4.0 always has JavaScript enabled. To enable JavaScript for Netscape 3.x or Netscape 4.x, follow the instructions provided with the web browser. For JavaScript support and enabling instructions for other browsers, check with the browser vendor.

Feature Navigator is updated when major Cisco IOS software releases and technology releases occur. It contains feature information about mainline-, T-, S-, and P-trains. You can access Feature Navigator at the following URL:

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

Cisco IOS Software Documentation Set Contents

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents. The Cisco IOS software documentation set is shipped with your order in electronic form on the Documentation CD-ROM, unless you specifically ordered the printed versions.

Documentation Modules

Each module in the Cisco IOS documentation set consists of one or more configuration guides and one or more corresponding command references. Chapters in a configuration guide describe protocols, configuration tasks, and Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On Cisco.com and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On Cisco.com, beginning under the **Service & Support** heading:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

On the Documentation CD-ROM:

Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

Cisco IOS Release 12.2 Documentation Set

[Table 10](#) lists the contents of the Cisco IOS Release 12.2 software documentation set, which is available in both electronic and printed form.



Note

You can find the most current Cisco IOS documentation on Cisco.com and the Documentation CD-ROM. These electronic documents may contain updates and modifications made after the hard-copy documents were printed.

On Cisco.com at:

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.2

On the Documentation CD-ROM at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.2

Table 10 Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> • <i>Cisco IOS Configuration Fundamentals Command Reference</i> 	Cisco IOS User Interfaces File Management System Management
<ul style="list-style-type: none"> • <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i> • <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2</i> • <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2</i> 	Transparent Bridging SRB Token Ring Inter-Switch Link Token Ring Route Switch Module RSRB DLSw+ Serial Tunnel and Block Serial Tunnel LLC2 and SDLC IBM Network Media Translation SNA Frame Relay Access NCIA Client/Server Airline Product Set DSPU and SNA Service Point SNA Switching Services Cisco Transaction Connection Cisco Mainframe Channel Connection CLAW and TCP/IP Offload CSNA, CMPC, and CMPC+ TN3270 Server
<ul style="list-style-type: none"> • <i>Cisco IOS Dial Technologies Configuration Guide</i> • <i>Cisco IOS Dial Technologies Command Reference</i> 	Preparing for Dial Access Modem and Dial Shelf Configuration and Management ISDN Configuration Signaling Configuration Dial-on-Demand Routing Configuration Dial Backup Configuration Dial Related Addressing Service Virtual Templates, Profiles, and Networks PPP Configuration Callback and Bandwidth Allocation Configuration Dial Access Specialized Features Dial Access Scenarios
<ul style="list-style-type: none"> • <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Reference</i> 	LAN Interfaces Serial Interfaces Logical Interfaces
<ul style="list-style-type: none"> • <i>Cisco IOS IP Configuration Guide</i> • <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> • <i>Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols</i> • <i>Cisco IOS IP Command Reference, Volume 3 of 3: Multicast</i> 	IP Addressing and Services IP Routing Protocols IP Multicast
<ul style="list-style-type: none"> • <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i> • <i>Cisco IOS AppleTalk and Novell IPX Command Reference</i> 	AppleTalk Novell IPX

Table 10 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i> 	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
<ul style="list-style-type: none"> • <i>Cisco IOS Voice, Video, and Fax Configuration Guide</i> • <i>Cisco IOS Voice, Video, and Fax Command Reference</i> 	Voice over IP Call Control Signaling Voice over Frame Relay Voice over ATM Telephony Applications Trunk Management Fax, Video, and Modem Support
<ul style="list-style-type: none"> • <i>Cisco IOS Quality of Service Solutions Configuration Guide</i> • <i>Cisco IOS Quality of Service Solutions Command Reference</i> 	Packet Classification Congestion Management Congestion Avoidance Policing and Shaping Signaling Link Efficiency Mechanisms
<ul style="list-style-type: none"> • <i>Cisco IOS Security Configuration Guide</i> • <i>Cisco IOS Security Command Reference</i> 	AAA Security Services Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options Supported AV Pairs
<ul style="list-style-type: none"> • <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i> 	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
<ul style="list-style-type: none"> • <i>Cisco IOS Wide-Area Networking Configuration Guide</i> • <i>Cisco IOS Wide-Area Networking Command Reference</i> 	ATM Broadband Access Frame Relay SMDS X.25 and LAPB
<ul style="list-style-type: none"> • <i>Cisco IOS Mobile Wireless Configuration Guide</i> • <i>Cisco IOS Mobile Wireless Command Reference</i> 	General Packet Radio Service

Table 10 Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Terminal Services Configuration Guide</i> • <i>Cisco IOS Terminal Services Command Reference</i> 	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
<ul style="list-style-type: none"> • <i>Cisco IOS Configuration Guide Master Index</i> • <i>Cisco IOS Command Reference Master Index</i> • <i>Cisco IOS Debug Command Reference</i> • <i>Cisco IOS Software System Error Messages</i> • <i>New Features in 12.2 T-Based Limited Lifetime Releases</i> • <i>New Features in Release 12.2 T T</i> • <i>Release Notes</i> (Release note and caveat documentation for 12.2 T-based releases and various platforms) 	

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at <http://www.cisco.com>. Translated documentation can be accessed at http://www.cisco.com/public/countries_languages.shtml.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:
http://www.cisco.com/cgi-bin/order/order_root.pl
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

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

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC web site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following web site:

<http://www.cisco.com>

Technical Assistance Center

The Cisco TAC web site is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Web Site

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC web site:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC web site to quickly find answers to your questions.

To register for Cisco.com, go to the following web site:

<http://www.cisco.com/register/>

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following web site:

<http://www.cisco.com/tac/caseopen>

Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following web site:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

This document is to be used in conjunction with the documents listed in the “[Related Documentation](#)” section on page 28.

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