Release Notes for
Cisco Catalyst 4224 Access Gateway Switch for Cisco IOS Release 12.2(2)YC4

October 7, 2002

Note You can find the most current Cisco IOS documentation on Cisco.com.

These release notes for the Cisco Catalyst 4224 Access Gateway Switch describe the software features provided in Cisco IOS Release 12.2(2)YC4. These release notes are updated as needed.

Note Media Gateway Control Protocol (MGCP) is not supported even though it appears in the documentation and the CLI.

Contents

These release notes describe the following topics:

CISCO SYSTEMS

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Introduction

The Cisco Catalyst 4224 Access Gateway Switch is:

- An Ethernet switching router that provides Voice over IP (VoIP) gateway and IP telephony services.
- Designed to be part of a centralized Cisco CallManager application.

System Requirements

This section describes the system requirements for Cisco IOS Release 12.2(2)YC4 and includes the following sections:

- Memory Recommendations, page 2
- Hardware Supported, page 2
- Determining the Software Version, page 2

Memory Recommendations

Table 1   Minimum Memory Recommendations for the Cisco Catalyst 4224 Access Gateway Switch

Platforms	Image Name	Software Image	Flash Memory Recommended	DRAM Memory Recommended	Runs From
Cisco c4224	IP/FW PLUS IPSEC 3DES	c4224-ik9o3sx3-mz	32 MB Flash	64 MB DRAM	RAM
	IP PLUS	c4224-isx3-mz	32 MB Flash	64 MB DRAM	RAM
	BOOT	c4224-cboot-mz	32 MB Flash	64 MB DRAM	RAM
	IP PLUS/IPX/SNA/FW/IPSEC 3DES	c4224-a3ik9no3rsx3-mz	32 MB Flash	64 MB DRAM	RAM

Hardware Supported

Cisco IOS Release 12.2(2)YC4 supports the Cisco Catalyst 4224 Access Gateway Switch.

Determining the Software Version

To determine the version of Cisco IOS software running on your Cisco Catalyst 4224, log in to the Cisco Catalyst 4224 and enter the **show version** EXEC command:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.2(2) Software (c4224-isx3-mz), Version 12.2(2)YC4, RELEASE SOFTWARE
```

MIBs

The following Cisco proprietary MIBs are supported:

- CISCO-PROCESS-MIB
- CISCO-MEMORY-POOL-MIB
- CISCO-CDP-MIB

The following MIBs are supported:

- SNMP MIB-II
- ENTITY-MIB
- IF-MIB
- BRIDGE-MIB

Limitations and Restrictions

Cisco IOS Release 12.2(2)YC4 does not support:

- Inline power for 802.11b Wireless Access Points
- Media Gateway Control Protocol (MGCP)

Bug Fixes In Cisco IOS Release 12.2(2)YC4

The following reported bugs have been fixed or resolved in Cisco IOS Release 12.2(2)YC4:

- CSCin13860

  The maximum configurable clock rate on the WIC-2T card is 4 Mbps in the Cisco Catalyst 4224. In the Cisco 3640 and Cisco 2600, the WIC-2T card's configurable clock rate is 8 Mbps. There is no workaround.

- CSCdw33027

  While fixing vulnerabilities mentioned in the Cisco Security Advisory: Multiple SSH Vulnerabilities (http://www.cisco.com/warp/public/707/SSH-multiple-pub.html), we inadvertently introduced an instability in some products. When an attacker tries to exploit the vulnerability VU#945216 (described in the CERT/CC Vulnerability Note at http://www.kb.cert.org/vuls/id/945216), the SSH module will consume too much of the processor's time, effectively causing a Denial of Service (DoS). In some cases the device will reboot. In order to be exposed, enable SSH on the device.

  Affected product lines are:

  - All devices, including routers and switches, that run on Cisco IOS® Software supporting SSH
  - Cisco Catalyst 6000 switches running CatOS
  - Cisco PIX firewall
  - Cisco 11000 Content Service Switch family

  No other Cisco product is vulnerable. It is possible to mitigate this vulnerability by preventing or controlling the SSH traffic.

This advisory is available at http://www.cisco.com/warp/public/707/SSH-scanning.shtml.

- CSCdv48261

  The IOS Firewall Feature set, also known as Cisco Secure Integrated Software, also known as Context Based Access Control (CBAC), and introduced in Cisco IOS Release 11.2P, has a vulnerability that permits traffic normally expected to be denied by the dynamic access control lists.

  This vulnerability is documented as Cisco Bug ID CSCdv48261.

  No other Cisco product is vulnerable.

  There is no workaround.

  This advisory is available at http://www.cisco.com/warp/public/707/IOS-cbac-dynacl-pub.shtml.

- CSCdu81936

  If a router receives an Address Resolution Protocol (ARP) packet that has the router's own interface address but with a different MAC address, the ARP packet can overwrite the router's own MAC address in the ARP table, causing that interface to stop sending and receiving traffic. This attack is successful only against interfaces on the Ethernet segment that is local to the attacking host.

  Workaround: Hard code the interface's ARP table entry by using the **arp** *ip-address hardware-address type* [**alias**] global configuration command. This entry will remain in the ARP table until the **no arp** *ip-address hardware-address type* [**alias**] global configuration command is issued.

  Refer to the advisory at the following URL:
  http://www.cisco.com/warp/public/707/IOS-arp-overwrite-vuln-pub.shtml

  > **Note** CSCdu81936 does not apply to switches that run Cisco CatOS software. This caveat applies only to switches running Cisco IOS software.

- CSCdx67721

  A segmentation violation (SegV) exception may cause a router to reload unexpectedly. There is no workaround.

- CSCin14935

  Symptoms: Unable to configure PSTN Fallback

  Condition: Problem observed in c4gwy-io3sx3-mz.122-10.7.T6

  Workaround: None

- CSCin14541

  Symptom: **show tech-support** command output is inconsistent.

  Condition: Tested with c4gwy-io3sx3-mz.122-10.7.T6 and c4gwy-io3sx3-mz.122-11.5.T images.

  Workaround: None.

- CSCin14819

  Symptoms: Unable to configure Resource Threshold in Cisco Catalyst 4604 and Cisco Catalyst 4224.

  Conditions: Tested with the following images: c4gwy-ik8o3sx3-mz.122-10.7.T6, c4gwy-io3sx3-mz.122-10.7.T6.

  Workaround: None.

- CSCin12189

   Problem: Transparent Common Channel Signaling (TCCS) trunk on Cisco Catalyst 4224 does not come up.

   Description: Configure the TCCS on units under test UUT1 and UUT2, where UUT2 is a Cisco Catalyst 4224.

   Topology: Originating RTR <+++++++>UUT1----VOIP-----UUT2<+++++> Terminating Router.

   Symptoms: Unable to configure clear channel codec required to pass on D-channel transparent over the VOIP Cloud.

   Workaround: None.

- CSCin12221

   T.38 fax relay support has been added.

- CSCdx37274

   Symptoms: Analog phones connected to the Eight-Port FXS RJ21 Analog Interface Card may not receive a dial tone.

   Conditions: This symptom is observed in either of the following situations:

   1. Configuration download is enabled with two or more contiguous directory numbers assigned to the high-density FXS module. The configuration is then downloaded with a reset or restart of the system. No dial tone will result.

   2. Two or more contiguous dial peers are configured on the switch or router assigned to the high-density FXS module. The user enters the following commands for each assigned FXS port:

   ```
   Gateway(config)# voice-port slot/port
   Gateway(config-voiceport)# shutdown
   ```

   The dial peer configurations affecting the voice port are entered as:

   ```
   Gateway(config-voiceport)# cptone country
   Gateway(config-voiceport)# no shutdown
   ```

   No dial tone will be heard on any of the analog ports.

   Workaround: Disable the configuration download. Reload the system.

- CSCin12531

   Symptom: Multilink Frame Relay (FRF.16) is not available in Cisco Catalyst 4224.

   Conditions: Entering the **interface mfr** global configuration command results in the "% Invalid input detected" error message.

   Workaround: None.

- CSCin12404

   Symptom: Multilink PPP over Frame Relay (MLPoFR) is not available in Cisco Catalyst 4224.

   Conditions: Enter Frame-relay sub-interface mode. The option "ppp" is missing under the frame-relay DLCI configuration mode to enable MLPoFR.

   Workaround: None.

- CSCin11184

   Symptom: Unable to configure Traffic Policing in Cisco Catalyst 4224.

   Conditions: Create a class-map and attach the same to a policy-map. Try to configure Traffic Policing under the class. The **police** QoS policy-map class configuration command will be missing.

Workaround: None.

- CSCdx78574

  Symptom: The quality of voice traffic may be degraded.

  Conditions: This symptom is observed when voice traffic is sent over a saturated serial link on a Cisco Catalyst 4224 that has low latency queueing (LLQ) configured.

  Workaround: None.

- CSCdy06549

  When Pre-Fragmentation is enabled (as it is by default), packets larger than the MTU are dropped. Packets smaller than the MTU are not affected.

  Workaround: Disable Pre-Fragmentation or use process switching.

- CSCin15209

  Symptoms: A PRI trunk may go out of service. This symptom occurs when an inbound call from a PBX is received on a PRI trunk and when an access code is dialed to access the PBX (the same PBX that originated the call). Subsequent calls that are made on the PRI trunk do not go through.

  Conditions: This symptom is observed on a PRI trunk when calls are hairpinned on a Cisco Catalyst 4000 Access Gateway Module (AGM) that is running the c4gwy-io3sx3-mz.122-10.7.T6 image of Cisco IOS Release 12.2(10.7)T6.

  Workaround: Restart the controller or reload the router.

- CSCin14002

  Unable to make E1 E&M CAS calls in Cisco Catalyst 4224 when E&M voice port sends out 1111 as the busy signal instead of the 1101 signal that most PBXs expect.

  Condition: Not all PBXs or router are able to recognize 11111 as an E1 E&M port seize signal. Most Cisco routers have no problem handling the signal. Tested with c4224-io3sx3-mz.YC3.

  Workaround: Add the following configuration at the E&M voice port: **condition tx-c-bit off**.

- CSCdy32848

  Symptoms: Open Shortest Path First (OSPF) does not recognize the virtual interface of the VLAN when intra-area OSPF is configured.

  Conditions: This symptom is observed on a unit under test (UUT) switch that is running Cisco IOS Release 12.2. Because of this symptom, routing updates across the UUT fail.

  Workaround: Add the **ip ospf network broadcast** interface configuration command to the switch virtual interface (SVI). Even though the error messages still appear, OSPF updates take place.

- CSCdy60840

  An idle line will require approximately one second to process each character received with the high bit set. This may delay the start of an exec by the normal activation-character.

  Workaround: None. Try using a shorter cable.

- CSCdy62240

  Internet Security Association and Key Management Protocol (ISAKMP) security association (SA) negotiation fails with c4224-ik8o3sx3-mz-ei_throttle_yc_release_0905. Because of this, all the encryption tests fail. This is true for all the Transform sets and Routing Protocols.

  There is no workaround.

- CSCdu62489

  Enabling multicast fast switching may result in spurious accesses that cause high CPU utilization. There is no workaround.

- CSCdy23569

  Problem: When configured as an RTR responder, the Cisco Catalyst 4224 gives incorrect jitter data.

  Symptoms: The **show rtr collection-statistics** EXEC command on the RTR client router displays very high jitter statistics.

  Workaround: None

- CSCdt16110

  Description: An analog voice port configured with *alaw* companding port may experience excessive noise. The port also may not recognize DTMF digits in this configuration. Calls can still be received but there will be noise.

  Workaround: Use A-to-u law transcoding at the T1/E1 or VoIP port.

- CSCdv29907

  Description: Memory corruption in tplus_encode_ulong. Under unknown conditions, a Cisco router running 12.2(3.4)T or a later release, and using TACACS+ accounting, may reload due to memory corruption.

  Workaround: Disable TACACS+ accounting.

- CSCdw56572

  Description: Low latency queueing (LLQ) does not drop packets after configuration changes. If the configured LLW burst size is changed in a policy map that is attached to an interface but the configured LLQ bandwidth is not changed, priority queueing (PQ) will stop dropping packets. If the traffic going through PQ is much greater than the configured bandwidth, the minimum bandwidth guarantees of the classes are not met.

  Workaround: Remove and re-attach the service policy.

Caveats

Note MGCP is not supported in this release even though MGCP appears in the documentation and the CLI.

This section lists unresolved caveats that apply to this release of the Cisco Catalyst 4224 Access Gateway Switch. Caveats describe unexpected behavior or defects in the switch and its related software.

- CSCdv82735

  Description: If IP phones and Fast Ethernet ports are hard coded for speed and/or duplex, phones will never power up.

  Workaround: Set both IP phone and Fast Ethernet ports for AUTO negotiation.

- CSCin04963

  Description: SNMP query to *cpmCPUTotalTable* returns incorrect values.

  Workaround: None

- CSCin06538

   Description: SNMP response for the variable card type returns *unknown (1)* when the following cards are inserted in the Cisco Catalyst 4224:

   – + WIC-1T

   – + WIC-2T

   – + WIC-1DSU-T1

   Without this variable, these cards cannot be found in Cisco View.

   Workaround: None

- CSCin06631

   Description: IP address table rows cannot be created or modified by using SNMP.

   Workaround: None

- CSCin06633

   Description: The rows in *ipNetToMediaTable* cannot be created or modified by using SNMP.

   Workaround: None

- CSCin14059

   Description: DiffServe CodePoint (DSCP) marking for voice packets is broken.

   Workaround: None

- CSCin14106

   Description: Cannot transfer inbound VoIP calls between IP phones in SRST mode.

   Workaround: None

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, log in to Cisco.com and click **Software Center: Cisco IOS Software: Bug Toolkit: Bug Navigator II**. Another option is to go to http://www.cisco.com/support/bugtools/.

Related Documentation

The following sections describe the documentation available for the Cisco Catalyst 4224 Access Gateway Switch. These documents consist of hardware and software installation guides, Cisco IOS configuration guides and command references, system error messages, and other documents.

Use these release notes with these documents:

- Platform-Specific Documents, page 9

- Cisco IOS Software Documentation Set, page 9.

Platform-Specific Documents

These documents are available for the Cisco Catalyst 4224 Access Gateway Switch on Cisco.com and on the Documentation CD-ROM:

- *Catalyst 4224 Access Gateway Switch Software Configuration Guide*
- *Catalyst 4224 Access Gateway Switch Hardware Installation Guide*
- *Regulatory Safety and Compliance Information for Catalyst 4200 Series Access Gateway Switch*

On Cisco.com at:

Technical Documents: Documentation Home Page: Catalyst Switches: Catalyst 4224

On the Documentation CD-ROM at:

Cisco Product Documentation: Catalyst Switches: Catalyst 4224

Cisco IOS Software Documentation Set

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 at:

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

On the Documentation CD-ROM at:

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

Cisco IOS Release 12.2 Documentation Set Contents

Table 2 lists the contents of the Cisco IOS Release 12.2 software documentation set. These documents are available in electronic form and in printed form if ordered.

Note You can find the most current Cisco IOS documentation on Cisco.com.

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 2   Cisco IOS Release 12.2 Documentation Set

Books	Major Topics
• *Cisco IOS Configuration Fundamentals Configuration Guide* • *Cisco IOS Configuration Fundamentals Command Reference*	Cisco IOS User Interfaces File Management System Management
• *Cisco IOS Bridging and IBM Networking Configuration Guide* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2* • *Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2*	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
• *Cisco IOS Dial Technologies Configuration Guide* • *Cisco IOS Dial Technologies Command Reference*	Dial Access Modem and Dial Shelf Configuration and Management ISDN Configuration Signaling Configuration Point-to-Point Protocols Dial-on-Demand Routing Dial Backup Dial Related Addressing Service Network Access Solutions Large-Scale Dial Solutions Cost-Control Solutions Internetworking Dial Access Scenarios
• *Cisco IOS Interface Configuration Guide* • *Cisco IOS Interface Command Reference*	LAN Interfaces Serial Interfaces Logical Interfaces

Table 2   Cisco IOS Release 12.2 Documentation Set (continued)

Books	Major Topics
• *Cisco IOS IP Configuration Guide* • *Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services* • *Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols* • *Cisco IOS IP Command Reference, Volume 3 of 3: Multicast*	IP Addressing IP Services IP Routing Protocols IP Multicast
• *Cisco IOS AppleTalk and Novell IPX Configuration Guide* • *Cisco IOS AppleTalk and Novell IPX Command Reference*	AppleTalk Novell IPX
• *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide* • *Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference*	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
• *Cisco IOS Voice, Video, and Fax Configuration Guide* • *Cisco IOS Voice, Video, and Fax Command Reference*	Voice over IP Call Control Signaling Voice over Frame Relay Voice over ATM Telephony Applications Trunk Management Fax, Video, and Modem Support
• *Cisco IOS Quality of Service Solutions Configuration Guide* • *Cisco IOS Quality of Service Solutions Command Reference*	Packet Classification Congestion Management Congestion Avoidance Policing and Shaping Signaling Link Efficiency Mechanisms
• *Cisco IOS Security Configuration Guide* • *Cisco IOS Security Command Reference*	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
• *Cisco IOS Switching Services Configuration Guide* • *Cisco IOS Switching Services Command Reference*	Cisco IOS Switching Paths NetFlow Switching Multiprotocol Label Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
• *Cisco IOS Wide-Area Networking Configuration Guide* • *Cisco IOS Wide-Area Networking Command Reference*	ATM Frame Relay SMDS X.25 and LAPB

Table 2 *Cisco IOS Release 12.2 Documentation Set (continued)*

Books	Major Topics
• *Cisco IOS Mobile Wireless Configuration Guide* • *Cisco IOS Mobile Wireless Command Reference*	General Packet Radio Service
• *Cisco IOS Terminal Services Configuration Guide* • *Cisco IOS Terminal Services Command Reference*	ARA LAT NASI Telnet TN3270 XRemote X.28 PAD Protocol Translation
• *Cisco IOS Configuration Guide Master Index* • *Cisco IOS Command Reference Master Index* • *Cisco IOS Debug Command Reference* • *Cisco IOS Software System Error Messages* • *New Features in 12.2-Based Limited Lifetime Releases* • *New Features in Release 12.2 T* • *Release Notes* (Release note and caveat documentation for 12.2-based releases and various platforms)	

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com

Translated documentation is available at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped 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 through an annual subscription.

Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (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 Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the "Leave Feedback" section at the bottom of the page.

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

You can submit your comments by mail by using the response card behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: 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 online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco 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, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages

- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

http://www.cisco.com

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

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

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

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

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

This document is to be used in conjunction with the documents listed in the "Related Documentation" section.