Preface

This preface describes the objectives, audience, organization, and conventions of this document, and explains how to find additional information on related products and services. It contains the following sections:

Document Objective

This document provides instructions for operating, maintaining, and troubleshooting the core elements of the Cisco Media Gateway Controller (MGC) node, as listed below.

- Cisco MGCs
- Cisco Signaling Link Terminals (SLTs)
- Cisco Catalyst Multiswitch Routers (MSRs)

This document covers such topics systems operation and management, signaling channel operation, alarm management, and problem identification and resolution. The procedures in this document are to be used when your Cisco MGC node is configured with two Cisco MGCs working in a continuous service mode, unless otherwise specified.

Note The term *media gateway controller* used in this document is a generic term that applies to both the Cisco SC2200 Signaling Controller and the Cisco PGW 2200 products. Some of the documentation for your telephony solution might use the terms signaling controller and PSTN Gateway to refer to features that are unique to the separate products.

Note The Cisco PGW 2200 was formerly known as the Cisco VSC3000 Virtual Switch Controller. Some parts of this document may use this older name.

Audience

This guide is intended for three audiences: the system administrators, the system operators, and the system technicians.

- The system administrator manages the host administrative functions, including configuring and maintaining system parameters, granting group and user IDs, and managing all Cisco MGC files and directories. The system administrator should have an in-depth knowledge of UNIX and a basic knowledge of data and telecommunications networking.
- The system operator should be familiar with telecommunication protocols, basic computer software operations, computer terminology and concepts, hierarchical file systems, common UNIX shell commands, log files, and the configuration of telephony switching systems.
- The system technician should be familiar with telecommunication protocols, basic computer software operations, computer terminology and concepts, hierarchical file systems, common UNIX shell commands, log files, the configuration of telephony switching systems, the use of electrical and electronic telephony test equipment, and basic troubleshooting techniques.

Document Organization

The major sections of this guide are summarized in Table 1.

Table 1 Major Sections of This Guide

Chapter/ Appendix	Title	Description
Chapter 1	Cisco MGC System Overview	Includes high-level descriptions of the operations, maintenance, and troubleshooting procedures contained in this guide.
Chapter 2	Cisco MGC Node Component Startup and Shutdown Procedures	Contains the recommended startup and shutdown procedures for each component of the Cisco MGC node.
Chapter 3	Cisco MGC Node Operations	Explains how to manage Cisco MGC operations, including starting and stopping the application, running the process manager, operating the switchover process, retrieving signal channel attributes, and changing signal service states.
Chapter 4	Maintenance and Troubleshooting Overview	Contains the overall maintenance strategies for the Cisco MGC node.
Chapter 5	Maintaining the Cisco MGC	Describes maintenance of the Cisco MGC hosts, including LED descriptions, shutdown and restart procedures, spare parts stocking levels, the log rotation utility, the diskmonitor program, and backup procedures.

Table 1 Major Sections of This Guide (continued)

Chapter/ Appendix	Title	Description
Chapter 6	Maintaining the Cisco Signaling Link Terminal	Describes maintenance of the Cisco SLT, including checking equipment status, replacing a complete signal processor, replacing hardware components, and performing other maintenance tasks.
Chapter 7	Maintaining the Cisco Catalyst 5500 Multiswitch Router	Describes maintenance of Cisco Catalyst MSRs, including checking equipment status, replacing a complete router, and replacing various components.
Chapter 8	Troubleshooting the Cisco MGC Node	Describes strategies for isolating problems, including the use of system alarms, indicators, and interfaces. Explains how to troubleshoot the Cisco MGC. Troubleshooting includes working with alarms and resolving signaling channel problems, signaling destination problems, and bearer connection problems. System logs are also described.
Appendix A	Configuring Cisco MGC Report Files	Describes the Cisco MGC log files: how to view, print, and interpret log files. Also explains how to use the Cisco MGC software to retrieve network measurements and statistics, including call detail, measurement, and alarm records.
Appendix B	Troubleshooting Cisco SLT Signaling	Explains how to troubleshoot the Cisco SLTs, including Cisco SLT to STP signaling links and Cisco SLT to Cisco MGC signaling links.
Appendix C	Troubleshooting Cisco Catalyst 5500 Multiswitch Routers Signaling	Describes troubleshooting the Cisco MSR using the command line interface, as well as virtual pathways and links.
Appendix D	Cisco Media Gateway Controller Measurements	Lists the measurements used by the Cisco MGC.

Conventions

Table 2 provides descriptions of the conventions used in this document.

Table 2 Document Conventions

Convention	Description of usage	Comments
Boldface	Commands and keywords you enter literally as shown	**offset-list**
Italics	Variables for which you supply values	**command** *type interface* You replace the variable with the type of interface. In contexts that do not allow italics, such as online help, arguments are enclosed in angle brackets (< >).
Square brackets ([ ])	Optional elements	**command** [abc] abc is optional.
Vertical bars (|)	Separated alternative elements	**command** [abc | def] You can choose either abc or def, or neither, but not both.
Braces ({ })	Required choices	**command** { abc | def } You **must** use either abc **or** def, but not both.
Braces and vertical bars within square brackets ([{ | }])	A required choice within an optional element	**command** [abc { def | ghi }] You have three options: nothing, abc def, or abc ghi.
Caret character (^)	Control key	The key combinations ^D and Ctrl-D are equivalent: Both mean hold down the Control key while you press the D key. Keys are indicated in capital letters, but are not case-sensitive.
A string	A nonquoted set of characters	For example, when your are setting an SNMP community string to *public*, do not use quotation marks around the string; otherwise, the string will include the quotation marks.
`System prompts`	Denotes interactive sessions, indicates that the user enters commands at the prompt	The system prompt indicates the current command mode. For example, the prompt `Router (config) #` indicates global configuration mode.
`Screen` font	Terminal sessions and information the system displays	
Angle brackets (< >)	Nonprinting characters such as passwords	
Exclamation points (!) at the beginning of a line	A comment line	Comments are sometimes displayed by the Cisco IOS software.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the guide.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and familiar with standard practices for preventing accidents. (To see translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment.)**

Table 3 describes the various data type conventions used in this document.

Table 3 Data Type Conventions

Data Type	Definition	Example
Integer	A series of decimal digits from the set of 0 through 9 that represents a positive integer. An integer might have one or more leading zero (0) digits padded on the left side to align the columns. Leading zeros are always valid as long as the number of digits is less than or equal to ten digits total. The range of values is 0 through 4294967295.	123 000123 4200000000
Signed integer	This data type has the same basic format as the integer but can be positive or negative. When negative, it is preceded by the minus sign (–) character. As with the integer data type, this can be as many as 10 digits in length, not including the sign character. The value of this type has a range of –2147483647 through 2147483647.	123 –000123 –21000000001
Hexadecimal	A series of 16-based digits from the set of 0 to 9, a to f, or A to F. The hexadecimal number might have one or more 0 digits padded on the left side. For all hexadecimal values, the maximum size is 0xffffffff (8 hexadecimal digits).	1f3 01f3000
Text	A series of alphanumeric characters from the ASCII character set. Tab, space, and double quote (“ ”) characters cannot be used. Text can be as many as 255 characters; however, it is recommended that you limit the characters to no more than 32 for readability.	EntityID LineSES_Threshold99
String	A series of alphanumeric characters and white-space characters. A string is surrounded by double quotes on the left and right sides (“ ”). Text can be as many as 255 characters; however, it is recommended that you limit the characters to no more than 80 for readability.	“This is a descriptive string.”

Table 3 Data Type Conventions (continued)

Data Type	Definition	Example
Note	Hexadecimal and integer fields in files might have different widths (number of characters) for column alignment.	
IP address	The standard TCP/IP address expressed as four numbers, where each number is from 0 through 255 and consecutive numbers are separated by a period.	139.85.60.17 or 127.55.13.200

Note All known exceptions to these conventions are expressed in the specific format sections of this document.

Documentation Suite

The documents that make up the Cisco MGC documentation set are listed in Table 4. The grayed box in this table indicates the publication you are currently reading.

Table 4 Cisco MGC Documentation

Functional Area	Publication	Description and Audience
Hardware Installation	*Cisco Media Gateway Controller Hardware Installation Guide*	Describes how to install the hardware components of the Cisco MGC node. Includes detailed information on the environmental requirements for all the components and step-by-step hardware installation and operational verification procedures. Also provides a checklist of the hardware you should have before starting the installation and a checklist of all the connections for the components. The audience for these publications is the engineering personnel responsible for installing the components and verifying the hardware installation.
Software Installation	*Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide*	Describe the steps necessary to install and upgrade the software components of the Cisco MGC. The audience for these publications is the engineering personnel responsible for installing, configuring, and upgrading software for the respective solutions.
Software Release Notes	*Release Notes for the Cisco Media Gateway Controller Software Release 7*	Provides information that is specific to a particular release of the Cisco MGC software. The audience for these publications is the engineering personnel responsible for installing, configuring, and upgrading software for the respective solutions.

Table 4 Cisco MGC Documentation (continued)

Functional Area	Publication	Description and Audience
Provisioning	*Cisco Media Gateway Controller Software Release 7 Provisioning Guide* *Cisco Media Gateway Controller Software Release 7 Dial Plan Guide*	Provide step-by-step procedures for provisioning the Cisco MGC. The audience for these publications is the engineering personnel responsible for provisioning.
Operations, Maintenance, and Troubleshooting	*Cisco Media Gateway Controller Software Release 7 Operations, Maintenance, and Troubleshooting Guide*	Describes the procedures necessary to conduct day-to-day operations, to perform preventive and corrective maintenance, and to troubleshoot the various components of the solution. The audience for this publication is the system administrators, system operators, and service technicians responsible for operating, maintaining, and servicing the components of the respective solutions
Reference	*Regulatory Compliance and Safety Information for the Cisco Media Gateway Controller Hardware* *Cisco Media Gateway Controller Software Release 7 MML Command Reference Guide* *Cisco Media Gateway Controller Software Release 7 Messages Reference Guide* *Cisco Media Gateway Controller Software Release 7 Billing Interface Guide* *Cisco Media Gateway Controller Software Release 7 Management Information Base Guide*	Provide reference information for the hardware and software of the Cisco MGC. The audience for these publications is the engineering personnel responsible for installing, configuring, operating and upgrading software for the respective solutions.

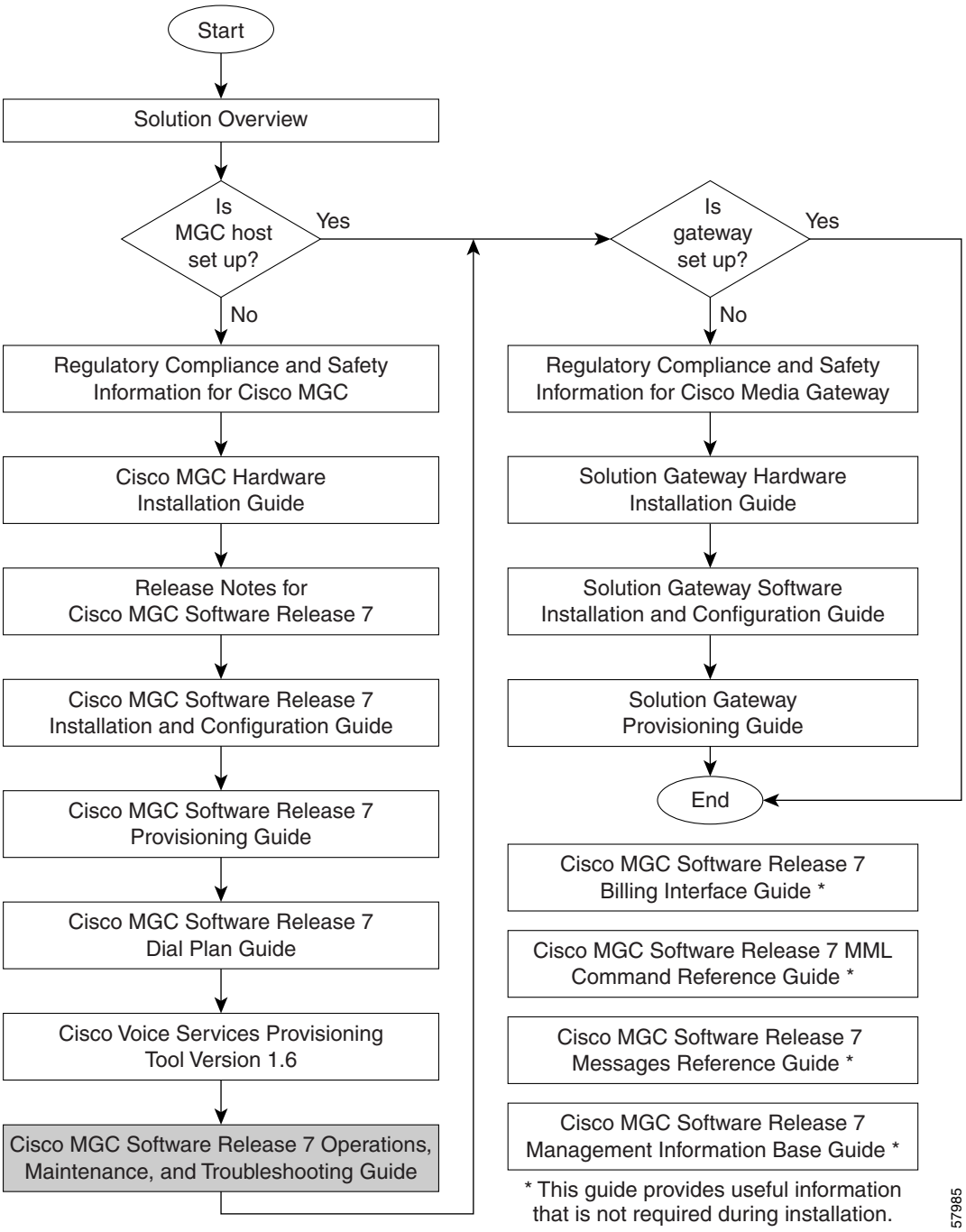
Related Documentation

Other useful reference publications include

- Overviews of the related telephony solutions—Describe the Cisco telephony solutions with which the Cisco MGC node is associated
- Provisioning guides for the related telephony solutions—Describe the provisioning steps for the Cisco telephony solutions with which the Cisco MGC node is associated
- Solution gateway installation and configuration guides—Describe how to install and configure the media gateway for a particular Cisco telephony solution.

Figure 1 shows the sequence in which the various manuals documenting Cisco telephony solutions should be read.

Figure 1 Documentation Roadmap



Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

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

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

International Cisco websites can be accessed from this URL:

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

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

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

Documentation Feedback

You can submit e-mail comments about technical documentation to bug-doc@cisco.com.

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

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour-a-day, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance. If you do not hold a valid Cisco service contract, please contact your reseller.

Cisco TAC Website

The Cisco TAC website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year. The Cisco TAC website is located at this URL:

http://www.cisco.com/tac

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

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

Opening a TAC Case

Using the online TAC Case Open Tool is the fastest way to open P3 and P4 cases. (P3 and P4 cases are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using the recommended resources, your case will be assigned to a Cisco TAC engineer. The online TAC Case Open Tool is located at this URL:

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

For P1 or P2 cases (P1 and P2 cases are those in which your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

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

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Go to this URL to visit the company store:

  http://www.cisco.com/go/marketplace/

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

  http://www.cisco.com/en/US/learning/index.html

Document Change History

Table 5 describes the document changes made after the initial release of the *Cisco Media Gateway Controller Software Release 7 Operations, Maintenance, and Troubleshooting Guide*.

Table 5 Summary History of Document Changes

Subject	Document Number, Change Date	Change Summary
Operations Overview	OL-0542-04, March 30, 2001	Under "Element Management subsection" section, added the CIAgent and Cisco VSPT to the list.
Cisco MGC Operations	OL-0542-04, March 30, 2001	Under "Managing Signaling Channels and Lines" section, added the "Managing Automatic Congestion Control" section, along with four related subsections. Under "Circuit Auditing" section, modified the Caution information on configuration library limitations. Under "Manual Switchover" section, modified the Caution information on configuration library limitations. Under "Config-Lib Viewer" section: • modified the Note information on configuration library limitations. • indicated that the backup and restore functions are no longer valid as of 7.4(12).
Cisco MGC Operations	OL-0542-04, March 30, 2001	Under "Setting Disk Space Utilization" section: • modified the Note information on configuration library limitations. • rewrote section to more accurately define the disk monitor program.
Interpreting Report Files	OL-0542-04, March 30, 2001	Rewrote the "Configuring Log Files" section. Also added a recommendation to this section to ensure system functioning during times of high call volume.
Entire Document	OL-0542-05, August 2, 2001	Imported latest documentation template. Removed all information specific to Release 7.3.
Cisco MGC System Overview	OL-0542-05, August 2, 2001	Changed the title of the chapter to more accurately reflect the content. Added Cisco MGC node description information from Troubleshooting Cisco MGC Node chapter.

Table 5 Summary History of Document Changes (continued)

Subject	Document Number, Change Date	Change Summary
Cisco MGC Node Component Startup and Shutdown Procedures	OL-0542-05, August 2, 2001	Changed the name of the chapter to more accurately reflect the content. Moved the "Starting MML" and "Managing Processes" sections to the Cisco MGC Node Operations chapter. Redefined the structure of the chapter.
Cisco MGC Node Operations	OL-0542-05, August 2, 2001	Changed the title of the chapter to more accurately reflect the content. Added a "Daily Operations" and regrouped existing procedures in it. Moved "Starting MML" and "Managing Processes" section over from the Starting and Stopping Software chapter. Modified the "Managing Automatic Congestion Control" section. Rewrote the "Setting Disk Utilization Levels" section, added the "Configuring Disk Monitor While the Software is Running" subsection. Updated all notes related to the 64 configurations limit to indicate that as of release 7.4(11), the number of configurations in the configuration library is automatically controlled using the disk monitor script.
Cisco MGC Node Operations	OL-0542-05, August 2, 2001	Moved field description information to the "Managing Traffic Channels" section from a similar section in the Troubleshooting the Cisco MGC Node chapter. Extensive additions, rewrites and links to content in other chapters.
Troubleshooting the Cisco MGC Node	OL-0542-05, August 2, 2001	Changed the title of the chapter to more accurately reflect the content. Removed the "Determining Traffic Channel States" section and referred to a similar section in the Cisco MGC Node Operations chapter. Added the "Alarm Troubleshooting Procedures" section which lists alarms that require corrective action. Extensive additions, rewrites, and links to content in the other chapters.

Table 5 Summary History of Document Changes (continued)

Subject	Document Number, Change Date	Change Summary
Configuring Cisco MGC Report Files	OL-0542-05, August 2, 2001	Changed the title of the "Configuring the Log Files" to "Configuring the Data Dumper". Added the "Configuring the Data Dumper to Support BAMS" section.
Troubleshooting Cisco SLT Signaling	OL-0542-05, August 2, 2001	Restructured content, reducing longer procedures to small modules.
Entire Document	OL-0542-05, August 15, 2001	Revised index markers throughout book.
Troubleshooting the Cisco MGC Node	OL-0542-05, August 15, 2001	Added the "Manually Resolving Stuck CICs" section.
Troubleshooting the Cisco MGC Node	OL-0542-05, October 1, 2001	Entered changes for 7.4(12), adding the following: • Procedures for modifying MTP and RLM timers • Procedure for enabling modification of properties.
Cisco MGC Node Operations	OL-0542-05, December 3, 2001	Updated field definitions for the **rtrv-cic** command. Updated chapter for timestamp changes. Added new backup procedures.
Troubleshooting the Cisco MGC Node	OL-0542-05, December 3, 2001	Updated chapter for timestamp changes. Added new restore procedures. Updated field definitions for the **set-admin-state** command.
Cisco MGC Node Operations	OL-0542-06, February 5, 2002	Added content on the new backup and restore viewers in the Cisco MGC toolbar. Modified ACC overload alarm descriptions.
Troubleshooting the Cisco MGC Node	OL-0542-06, February 5, 2002	Added new alarms. Added command descriptions to the *Viewing the Call Trace* section. Added the *Rebooting Software to Modify Configuration Parameters* section.
Configuring Cisco MGC Log Files	OL-0542-06, February 5, 2002	Updated the *Configuring the Data Dumper* Section. Added the *Understanding the Format of Log Files Archived Using Data Dumper* section.
Configuring Cisco MGC Log Files	OL-0542-06, February 12, 2002	Updated the *Configuring the Data Dumper* Section with a newly tested procedure.
Troubleshooting the Cisco MGC Node	OL-0542-06, February 20, 2002	Added a note to the Performing CIC Validation Tests Section indicating that these tests can only be performed on CICs associated with ANSI SS7-based DPCs. Modified the call stopping procedures to indicate that the confirm option must be used.

Table 5 Summary History of Document Changes (continued)

Subject	Document Number, Change Date	Change Summary
Cisco MGC Node Operations	OL-0542-06, June 26, 2002	Updated state information for the **rtrv-cic** command. Updated backup operation section. Added a procedure to verify the amount of available virtual memory. Removed procedure for the **rtrv-eqpt** command. Adjusted range settings for the **blk-cic** command.
Troubleshooting the Cisco MGC Node	OL-0542-06, June 26, 2002	Updated descriptions of the commands to set the state of destinations and SPCs. Removed procedure for the **set-eqpt-state** command. Updated state information for the **query-cic** command.
Configuring Cisco MGC Log Files	OL-0542-06, June 26, 2002	Clarified content to indicate that multiple CDBs can be created for each call.
Cisco MGC Node Operations	OL-0542-06, December 29, 2003	Modified the *Backing up System Software* section with information regarding scheduling regular back-ups and removal of the .tar extension from the example backup files. Corrected default setting information for the *diskmonitor.SoftLimit* XECfgParm.dat parameter. Updated the *Verifying the Patch Level of the Cisco MGC* section, including information for the introduction of the Software Inventory Control functionality.
Troubleshooting the Cisco MGC Node	OL-0542-06, December 29, 2003	Updated descriptions of the **query-cic** command indicating that it is not supported in all SS7 variants, and that it is able to support individual supervision messages.