Release Notes for Cisco 12000 Series Gigabit Switch Routers for Cisco IOS Release 11.2 GS

March 4, 2002

This release note describes the features and caveats for the Cisco 12000 series Gigabit Switch Routers (GSRs) that support Cisco IOS Release 11.2 GS, up to and including Release 11.2(19)GS8. Cisco IOS Release 11.2(19)GS8 is based on Cisco IOS Release 11.2(19)P. Release 11.2(19)GS8 fixes software defects and supports new features not in earlier versions of 11.2 GS. For information on the release policy for Release 11.2 GS, refer to the Cisco IOS Software Release 11.2GS Product Bulletin #717 located on Cisco Connection Online (CCO).

Use these release notes in conjunction with the *Release Notes for Cisco IOS Release 11.2*. In addition to the caveats listed in the "Release 11.2 GS Caveats" section, the software caveats that apply to Release 11.2 also apply to Release 11.2 GS. For important information about this release, refer to the "Important Notes" section later in this document.

The Cisco 12000 series product class of GSRs performs Internet routing and switching at gigabit speeds. The Cisco 12000 series meets the exponential growth in demand for Internet bandwidth and brings scalability and high-performance services to IP-based networks. Designed to meet current and future Internet traffic requirements, the Cisco 12000 series supports IP backbone links at OC-3/STM-1 (155 Mbps), OC-12/STM-4 (622 Mbps), and OC-48/STM-16 (2.48 Gbps).

Beginning with Cisco IOS Release 11.2, Cisco Systems provides several software release "trains" based on a single version of Cisco IOS software. Maintenance releases of the Major train software deliver fixes to software defects only, thus providing the most stable software for your network, for the features you need. In addition to the Major train, there are several Early Deployment (ED) trains. One ED train—Release 11.2 GS—delivers both fixes to software defects and support for the new Cisco 12000 series.

This release note does not describe features that are available in Release 11.2 or other ED trains. For information about features in Release 11.2, refer to the *Release Notes for Cisco IOS Release 11.2*. For information about features in other ED trains, refer to the specific release note for that train or the product-specific release notes. For additional information on features supported in Cisco IOS Release 11.2, refer to the Cisco IOS Software Product Bulletins.

This release note discusses the following topics:

- Documentation, page 3
- Platform Support for Release 11.2 GS, page 7

78-4876-25

Documentation

For the Cisco 12000 series GSRs, the documentation set consists of an installation and configuration guide and several configuration and installation notes. For Cisco IOS Release 11.2, the Cisco IOS documentation set consists of several modules, each module consisting of a configuration guide and a command reference. The documentation set also includes several supporting documents. Because not all features in the Cisco IOS documentation set are applicable to the Cisco 12000 series, only documents that contain features supported by the Cisco 12000 series are listed. For a list of the documents and chapter topics, refer to Table 1 and Table 2. All the documents mentioned are available as printed manuals or electronic documents.

In addition to the Cisco IOS documentation set, new software features and error messages for the Cisco 12000 series are documented in feature modules that are available online only. The feature modules contain a brief description of the feature and new or modified Cisco IOS commands supported by the feature.

For electronic documentation on the Documentation CD-ROM, refer to the Cisco 12000 series installation and configuration guides, which are located in the Core/High End Routers database, and the Cisco IOS Release 11.2 configuration guides and command references, which are located in the Cisco IOS Software Configuration, Cisco IOS Release 11.2 database. You can also access Cisco technical documentation on the Web at http://www.cisco.com. For more information, refer to the "Cisco Connection Online" and "Documentation CD-ROM" sections later in this release note.

In addition, the following features modules for the Cisco 12000 series are linked to the applicable Cisco IOS feature module for easy online access from this release note. Click on the link to open the feature module.

- Cisco 12000 Gigabit Switch Routers
- Cisco Express Forwarding
- System Error Messages
- Multicast Distributed Switching
- Automatic Protection Switching of Packet-over-SONET Circuits
- GRP Redundant Processor Support

> **Note** The most up-to-date Cisco IOS documentation can be found on the latest Documentation CD-ROM and on the Web. These electronic documents contain updates and modifications made after the paper documents were printed.

Table 1   Cisco 12000 Series Documentation

Books	Chapter Topics
Cisco 12012 Gigabit Switch Router Installation and Configuration Guide	Product Overview Preparing for Installation Installing a Cisco 12012 Observing System Startup and Performing a Basic Configuration Troubleshooting the Installation Running Diagnostics on the Cisco 12012 Maintaining the Cisco 12012 Repackaging the Cisco 12012
Cisco 12008 Gigabit Switch Router Installation and Configuration Guide	Product Overview Preparing for Installation Installing a Cisco 12008 Observing System Startup and Performing a Basic Configuration Troubleshooting the Installation Running Diagnostics on the Cisco 12008 Maintaining the Cisco 12008 Repackaging the Cisco 12008
Gigabit Route Processor (GRP) Installation and Configuration	What Is the GRP? Installation Prerequisites Installing a GRP Overview of the GRP Boot Processes Starting the System and Observing Initial Conditions Verifying Interface Status Using GRP LED Indicators Implementing Other Configuration Tasks Upgrading GRP Memory
OC-12c/STM-4c Asynchronous Transfer Mode Line Card Installation and Configuration	ATM Overview What Are the Cisco 12000 Series Gigabit Switch Routers? What Is the OC-12c/STM-4c ATM Line Card? Installation Prerequisites Line Card Replacement Procedures OC-12c/STM-4c ATM Interface Cables Using LEDs to Check OC-12c/STM-4c ATM Line Card Status Configuring the OC-12c/STM-4c ATM Line Card Using the Debug ATM Commands Troubleshooting

Table 1   Cisco 12000 Series Documentation (continued)

Books	Chapter Topics
OC-12c/STM-4c Packet-Over-SONET Line Card Installation and Configuration	Packet-Over-SONET Overview Packet-Over-SONET and PPP Reference Material What Are the Cisco 12000 Series Gigabit Switch Routers? What Is the OC-12c/STM-4c POS Line Card? Installation Prerequisites Line Card Replacement Procedures OC-12c/STM-4c POS Interface Cables Using LEDs to Check OC-12c/STM-4c POS Line Card Status Configuring the OC-12c/STM-4c POS Line Card Troubleshooting
Quad OC-3c/STM-1c Packet-Over-SONET Line Card Installation and Configuration	Packet-Over-SONET Overview Packet-Over-SONET and PPP Reference Material What Are the Cisco 12000 Series Gigabit Switch Routers? What Is the Quad OC-3c/STM-1c POS Line Card? Installation Prerequisites Line Card Replacement Procedures Quad OC-3c/STM-1c POS Interface Cables Using LEDs to Check Quad OC-3c/STM-1c POS Line Card Status Configuring the Quad OC-3/STM-1c POS Line Card Troubleshooting
Channelized OC-12 to DS3 Line Card Installation and Configuration	Product Description Installation Prerequisites and Preparation Safety Guidelines Installing or Replacing a Line Card Cable-Management Bracket Checking the Installation Configuring the LC-OC12-DS3 Line Card DS3 Serial Interface on OC-12 Controller Configuration Example Cisco Remote Connection Management Customizing the LC-OC12-DS3 Line Card Configuration Configuration Examples
Quad OC-3 ATM Line Card Configuration and Installation	ATM Terms and Acronyms ATM Overview What Are the Cisco 12000 Series Gigabit Switch Routers? What Is the Quad OC-3c/STM-1c ATM Line Card? Installation Prerequisites and Preparation Installing or Replacing a Line Card Checking the Installation Configuring the Interface on the Quad OC-3c/STM-1c ATM Line Card Using the Debug ATM Commands

Table 2   Cisco IOS Documentation

Books	Chapter Topics
• *Configuration Fundamentals Configuration Guide* • *Configuration Fundamentals Command Reference*	Access Server and Router Product Overview User Interface System Images and Configuration Files Using ClickStart, AutoInstall, and Setup Interfaces System Management
• *Security Configuration Guide* • *Security Command Reference*	Network Access Security Terminal Access Security Accounting and Billing Traffic Filters Controlling Router Access Network Data Encryption with Router Authentication
• *Access Services Configuration Guide* • *Access Services Command Reference*	Terminal Lines and Modem Support Network Connections AppleTalk Remote Access SLIP and PPP XRemote LAT Telnet TN3270 Protocol Translation Configuring Modem Support and Chat Scripts X.3 PAD Regular Expressions
• *Wide-Area Networking Configuration Guide* • *Wide-Area Networking Command Reference*	ATM Dial-on-Demand Routing (DDR) Frame Relay ISDN LANE PPP for Wide-Area Networking SMDS X.25 and LAPB
• *Network Protocols Configuration Guide, Part 1* • *Network Protocols Command Reference, Part 1*	IP IP Routing
• *Cisco IOS Software Command Summary* • *System Error Messages* • *Debug Command Reference* • *Cisco Management Information Base (MIB) User Quick Reference*	

Platform Support for Release 11.2 GS

Cisco IOS Release 11.2 GS supports the following platforms:

- Cisco 12016
- Cisco 12012
- Cisco 12008

Table 3 summarizes the interfaces supported on these platforms.

Table 3   Interfaces Supported on Cisco 12000 Series

Interface
Channelized OC-12 to DS3
OC-12c/STM-4c ATM
OC-12c/STM-4c POS
OC-3c/STM-1c POS
Quad OC-3c/STM-1c ATM
OC-48c/STM-16c POS
Quad OC-12c/STM-4c POS
CHOC-12/STM4-STS-3/STM1
Gigabit Ethernet
1OC-12/STM-4 Spatial Reuse Protocol
6DS3-SMB and 12DS3-SMB
8-Port Fast Ethernet
Enhanced OC-48c/STM-16c POS
Enhanced Quad OC-12c/STM-4c POS

New Features in Release 11.2(19)GS8

Cisco IOS Release 11.2(19)GS8 introduces no new features. See "New Features in Release 11.2(19)GS1."

New Features in Release 11.2(19)GS7

Cisco IOS Release 11.2(19)GS7 introduces no new features. See "New Features in Release 11.2(19)GS1."

New Features in Release 11.2(19)GS5

Cisco IOS Release 11.2(19)GS5 introduces no new features. See "New Features in Release 11.2(19)GS1."

New Features in Release 11.2(19)GS4

Cisco IOS Release 11.2(19)GS4 introduces no new features. See "New Features in Release 11.2(19)GS1."

New Features in Release 11.2(19)GS3

Cisco IOS Release 11.2(19)GS3 introduces no new features. See "New Features in Release 11.2(19)GS1."

New Features in Release 11.2(19)GS1

Note This release was deferred from general distribution.

The following new features were added for Release 11.2(19)GS1:

- Cisco 12016 Gigabit Switch Router—Support for the Cisco 12016 GSR was added in this release.
- Enhanced Quad OC-12c/STM-4c POS line card—Support for the enhanced Quad OC-12c/STM-4c POS was added in this release.
- Turbo Access Lists (ACL)—The Turbo ACL feature processes access lists more expediently, providing faster functionality for routers equipped with the feature.
- APS Reflector Mode—Support for APS reflector mode was added in this release. APS reflector mode enhances the operation of APS by decreasing the remote timeout that occurs when a remote router is informed of a switchover between the working router and protect router in an automatic protection switching (APS) circuit.

New Features in Release 11.2(18)GS4

Cisco IOS Release 11.2(18)GS4 introduces no new features.

New Features in Release 11.2(18)GS3

Cisco IOS Release 11.2(18)GS3 introduces no new features.

New Features in Release 11.2(18)GS2

The following new features were added for Release 11.2(18)GS2:

- 8-Port Fast Ethernet—Support for the 8-Port Fast Ethernet line card was added in this release.

Note This release was deferred from general distribution.

New Features in Release 11.2(18)GS1

The following new features were added for Release 11.2(18)GS1:

- ATM VP Traffic Shaping—VP shaping is supported by the **atm pvp** interface configuration command. Note that OAM F4 is not supported by VP shaping in this release.

Note This release was deferred from general distribution.

New Features in Release 11.2(17)GS1

The following new features were added for Release 11.2(17)GS1:

- Dynamic Packet Transport (DPT) and Spatial Reuse Protocol (SRP)—DPT rings are dual, counter-rotating fiber rings. Both fibers are used concurrently to transport both data and control traffic. DPT rings use Intelligent Protection Switching (IPS) to provide proactive performance monitoring, event detection, rapid self-healing, and IP service restoration after fiber facility or node failures.

  Spatial Reuse Protocol (SRP) is the media-independent Media Access Control (MAC) layer that enables DPT functionality in ring configurations. Spatial Reuse refers to the fact that unicast packets traverse only the necessary spans between the source and the destination.

Note This release was deferred from general distribution.

New Features in Release 11.2(15)GS7

The following new or modified commands were added for Release 11.2(15)GS7:

- [**default**|**no**] **failover timeout** *value* — The **failover timeout** main CPU configuration command lets you adjust the failover timeout value, which has a default value 4 seconds. The timeout value is specified in milliseconds. Under normal circumstance there is no need to change this value. However, in some instances where you temporarily experience large CPUHOG values, a failover might be forced at the default value. You can increase the timeout value until the CPUHOG situation no longer forces a failover. After the CPUHOG situation is resolved, restore the default timout value.

New Features in Release 11.2(15)GS5

Cisco IOS Release 11.2(15)GS5 introduces no new features.

New Features in Release 11.2(15)GS4

Cisco IOS Release 11.2(15)GS4 introduces no new features.

Note Cisco IOS Release 11.2(14)GS4 was built but was not released.

New Features in Release 11.2(15)GS3

Cisco IOS Release 11.2(15)GS3 introduces no new features.

New Features in Release 11.2(15)GS2

The following new features were added for Release 11.2(15)GS2:

- Gigabit Route Processor (GRP) Redundant Processor—The GRP redundant processor feature allows you to install two gigabit route processors (GRPs) in a Cisco 12000 series router. One GRP functions as the *primary* processor. The primary GRP supports all normal GRP operation. The other GRP functions as the *secondary* processor. The secondary GRP monitors the primary and will take over normal GRP operations if it detects a failure in the primary GRP.

- APS—The automatic protection switching (APS) feature supported on Cisco 1200 series routers has been extended to the following line cards:
  - OC-48c/STM-16c POS
  - Quad OC-12c/STM-4c POS

- RFC 1483 Bridged PVC Encapsulation—Using RFC 1483 bridged PVC encapsulation on a Cisco 12000 series router, you can connect a GSR ATM interface directly to a Catalyst 5000 series switch ATM port. When you configure the GSR ATM interface, you must create a new 1483 half-bridge PVC connection using a multipoint sub-interface. Only one PVC half-bridge connection per sub-interface is allowed; however, other non-PVC connections (SVC or non-bridged PVC) are allowed on the sub-interface. Configure MTU size of 1500 so that the Catalyst switch will not drop packets. Full bridging in the GSR is not supported. Also note that Ethernet format is supported. IEEE 802.3 format is not supported at this time.

New Features in Release 11.2(15)GS1

The following new features were added for Release 11.2(15)GS1:

- The following ATM features are now supported on the Quad OC-3c/STM-1c ATM line card:
  - Multicast
  - Committed Access Rate (CAR)

- Access lists (ACL)

- Operation, Administration, and Maintenance (OAM)

- Switched virtual circuits (SVC)

Refer to the sections "New Features in Release 11.2(14)GS2" and "New Features in Release 11.2(14)GS1," later in this publication, for additional information on these features.

- Frame Relay Switching—Frame Relay switching is a means of switching packets based upon the DLCI, which can be looked upon as the Frame Relay equivalent of a MAC address.

- Hot Standby Routing Protocol (HSRP)—HSRP provides automatic router backup when you configure HSRP on Cisco routers that run the Internet Protocol (IP) over Ethernet.

- The Cisco 12000 series routers supports the following line cards:

  - The CHOC-12/STM4-STS-3/STM1 line card provides the Cisco 12000 series routers with 4 ports of high-density STS-3/STM1 service through a single 622-Mbps OC-12/STM4 interface. The card interfaces with the Cisco 12000 router's switch fabric and provides one OC-12/STM4 duplex SC single-mode intermediate-reach SONET/SDH connection.

  - The Quad OC-12c/STM-4c POS line card provides the Cisco 12000 series routers with four independent OC-12c/STM-4c POS ports on a single card.

  - The Gigabit Ethernet line card provides Cisco 12000 series routers with an optical Ethernet interface on a single card that operates faster than 1-Gbps. The card interfaces with the switch fabric in the Cisco 12000 series routers and provides one Gigabit Ethernet SC single-mode or multimode connection. A full fabric is required when a Gigabit Ethernet line card is installed.

New Features in Release 11.2(14)GS3

The following new features were added for Release 11.2(14)GS3:

- Multiplex Section Protection (MSP) Switching—MSP in SDH networks is supported in this release. MSP signalling is turned on, along with SDH framing, by the **pos framing sdh** command, on an interface-by-interface basis. MSP in SDH networks implements the failover switching of APS for SDH. Functionally, MSP switching in SDH networks is identical to APS switching in SONET networks.

- Access Lists (ACL)—Extended and standard access list support is now provided.

- The Cisco 12000 series supports the following line cards:

  - OC-48c/STM-16c POS line card provides the Cisco 12000 series routers with a single 2488.320 Mbps (2.5 Gbps) OC-48 interface. The card interfaces with the Cisco 12000 router's switch fabric and provides one OC-48c/STM-16c duplex SC or FC single-mode short-reach SONET connection. Committed access rate (CAR) and access lists are supported on the OC-48c/STM-16c POS line card.

New Features in Release 11.2(14)GS2

The following new features were added for Release 11.2(14)GS2:

- ATM PVC OAM management support—The ATM management support is a subset of the ATM management offered in Cisco IOS Release 11.3T. Refer to "Enhanced ATM VC Configuration and Management" in the online feature module documentation for additional information. The **atm pvc** interface command is modified to monitor the Alarm Indication Signal (AIS) status.

- Committed Access Rate (CAR)—Use CAR to rate-limit traffic based on certain matching criteria, such as incoming interface, IP precedence, QoS group, or IP access list criteria. CAR provides configurable actions, such as transmit, drop, set precedence, or set QoS group, when traffic conforms to or exceeds the rate limit. Refer to "Committed Access Rate" in the online feature module documentation for additional information.

- Access Lists (ACL)—Standard access list support is now provided. A future release of Release 11.2GS will provide support for extended access lists.

- New or modified commands—The following commands were added or changed in Release 11.2(14)GS2. For more information, refer to the Cisco 12000 Series Gigabit Switch Router feature module.

  – **atm pvc** interface configuration command—Provides OAM management support for ATM PVCs configured on an ATM interface in the GSR.

New Features in Release 11.2(14)GS1

The following new features were added for Release 11.2(14)GS1:

- ATM switched virtual circuits—The ATM switched virtual circuits (SVC) feature is now supported in Cisco IOS 11.2 GS. See the "Configure Classical IP and ARP over ATM on the Cisco 7000 Family" sections in the *Cisco IOS Release11.2 Wide-Area Networking Configuration Guide* and *ATM Commands* document for configuration and reference information. ATM SVC support on the GSR is the same as for the AIP interface on the Cisco 7000 series routers.

Note   The ATM SVC feature should not be used on the Quad OC-3c/STM-1c ATM line card in this release.

- ATM MIB support for per VC MIB statistics—The Cisco AAL5 MIB adds a proprietary extension to the standard ATM MIB (RFC 1695) to provide per-VC statistic counters that are currently displayed in response to the Cisco IOS show atm vc command for a specified virtual circuit. This MIB extension allows SNMP network management system applications to query the same variables (SNMP objects) as those that can be gathered from the Cisco IOS command line interface.

  The Cisco AAL5 MIB provides SNMP access to four new statistic counters defined for AAL5 virtual connections: incoming packet counter, outgoing packet counter, incoming octet counter, and outgoing octet counter. The Cisco AAL5 MIB groups these four counters in a table called cAal5VccTable.

  This feature supports all the tables and objects defined in the Cisco AAL5 MIB for ATM interfaces acting as endpoints of ATM connections that run Cisco IOS Release 11.2 GS software.

- 64-bit MIB—The 64-bit High Capacity MIB was created to retrieve certain high capacity counters for Cisco IOS 11.2 GS software that does not support SNMPv2c. This MIB allows each of the following objects to be presented as two 32 bit objects: ifHCInOctets, ifHCInUcastPkts, ifHCOutOctets, and ifHCOutUcastPkts. One object will represent the upper 32 bits and the other the lower 32 bits. In order to get a correct representation of the 64 bit number, the corresponding 32 bit objects, upper and lower, must be requested in the same PDU. This MIB is supported in Cisco IOS 11.2GS and will not be ported to any later version if Cisco IOS software.

- ATM IP Multicast—Multicast Distributed Switching (MDS), first introduced for POS interfaces in Release 11.2(11)GS1, is now supported on ATM interfaces.

Note The ATM IP Multicast feature should not be used on the Quad OC-3c/STM-1c ATM line card in this release.

- Crashinfo—Crashinfo is a tool that was developed to aid in diagnosing otherwise intractable RSP, VIP2, and GRP crashes. Important diagnostic information is stored in a flash card and can be retrieved after reload to help analyze the problem.

New Features in Release 11.2(11)GS3

The following new features were added for Release 11.2(11)GS3:

- The known problems with APS in Release 11.2(11)GS2 are resolved.

New Features in Release 11.2(11)GS2

The following new features were added for Release 11.2(11)GS2:

- APS—The automatic protection switching (APS) feature is supported on Cisco 1200 series routers. This feature supports automatic switching of packet-over-SONET (POS) circuits in case of circuit failure. APS is often required when connecting SONET equipment to telco equipment. APS refers to the mechanism of introducing a "protect" POS interface in the SONET network to serve as backup for a "working" POS interface. For additional information, refer to the online feature module "Automatic Protection Switching of Packet-over-SONET Circuits."

Caution Because of a known problem in APS in 11.2(11)GS2, Cisco recommends that APS use be limited to testing and evaluation purposes, and that full-scale APS deployment be delayed until the next 11.2GS software release. The APS problem occurs only rarely, but is a possibility in a heavily-loaded system. It effectively disables the affected port(s), producing many console error messages.

Note In addition, when you boot the GSR with 11.2(11)GS2, the following error message may appear at boot time on ports configured for APS operation. This message can be ignored:

```
%IPCGRP-3-CMDOP: IPC command 17 (slot2/0): linecard is disabled
-Traceback= 6001AF5C 6001B7F4 60178344 ... (etc.)
```

- Frame Relay Transport—Cisco's POS interfaces support Frame Relay encapsulation of IP packets, allowing the Cisco 12000 to exchange packets with Frame Relay routers and customer premise equipment (CPE). The POS interfaces connect directly to the SONET network, and the Frame Relay traffic is transmitted and received across the SONET network at DS3 or OC-3 rates.

- Framer reset behavior and alarm control—Prior to 11.2(11)GS2, when a POS interface shut down the framer was reset. In 11.2(11)GS2 and later, the framer no longer is reset when a POS interface is shut down. The **pos ais-shut** interface configuration command controls whether an Alarm Indication Signal - Line (AIS-L) is sent when a POS interface is shut down. The default behavior

is that AIS-L is not asserted. To send AIS-L when a POS line card is shut down, configure the interface with the **pos ais-shut** command. It is possible for an interface to shut down silently (no alarm) if **pos ais-shut** is not configured.

- New or modified commands—The following commands were added or changed in Release 11.2(11)GS2. In some cases, the commands existed in 11.2(11)GS1, but were not documented. For more information, refer to the Cisco 12000 Series Gigabit Switch Routers feature module attached to this document.

    - **upgrade** EXEC command—Downloads microcode to processor cards in the GSR.

    - **tx-queue-limit** interface command—Limits the total number of buffers allowed on the transmit interface queue.

    - **pos ais-shut** interface configuration command—Asserts AIS-L (also called LAIS) when POS interfaces are shut down.

- Line cards supported on the Cisco 12000 series:

    - LC-OC12-DS3 line card provides the Cisco 12000 series routers with 12 ports of high-density DS3 service via a single 622-Mbps OC-12 interface. The card interfaces to the Cisco 12000 router's switch fabric and provides one OC-12 duplex SC single-mode intermediate reach SONET connection.

New Features in Release 11.2(11)GS1

The following new features were added for Release 11.2(11)GS1:

- Multicast Distributed Switching (MDS)—Prior to multicast distributed switching (MDS), IP multicast traffic was always switched at the Route Processor (RP) in the Route Switch Processor (RSP)-based platforms. With Cisco IOS Release 11.2 GS, IP multicast traffic can be distributed switched on RSP-based platforms with Versatile Interface Processors (VIPs). Furthermore, MDS is the only multicast switching method on the Cisco 12000 Gigabit Switch Routers (GSRs), starting with Cisco IOS Release 11.2(11) GS.

New Features in Release 11.2(9)GS7

The following new features were added for Release 11.2(9)GS7:

- Clock Scheduler Card (CSC) and Switch Fabric Card (SFC) Diagnostics—Prior to Release 11.2(9)GS7, diagnostics was allowed only on the Gigabit Route Processor (GRP) and the line cards. With Release 11.2(9)GS7, diagnostics is supported on all SFCs. Diagnostics also may be run on a CSC if a redundant CSC is in the router. Diagnostics will stop and ask you for confirmation before altering the router's configuration. For example, running CSC/SFC diagnostics on a SFC or CSC will cause the fabric to go from full bandwidth to one quarter bandwidth. Bandwidth is not affected by GRP or line card diagnostics.

- ATM Enhancements—The OC-12c/STM-4c ATM line card now supports Interim Local Management Interface (ILMI). ILMI is a specification developed by the ATM Forum for incorporating network management capability into the ATM UNI. Use the following interface configuration commands to configure this feature: **atm address-registration**, **atm esi-address**, **atm ilmi-keepalive**, and **atm pvc** with a vpi of **0**, a vci of **16**, and an aal-encap of the **ilmi**. To display information about this feature, use the **show atm ilmi** EXEC command.

New Features in Release 11.2(9)GS4

The following new features were added for Release 11.2(9)GS4:

- Cisco 12008 Gigabit Switch Router—The Cisco 12008 is built around a high-speed switching fabric that provides nonblocking bandwidth to support high-performance IP-based LANs and WANs. The switching fabric is scalable from 10 to 40 Gbps on the Cisco 12008. The Cisco 12008 supports IP over SONET/SDH and ATM interfaces. The Cisco 12008 has eight user-configurable slots. These slots contain line cards and the Gigabit Route Processor (GRP) card. Network interfaces reside on line cards that provide connection between the router's switch fabric and the external networks. For more information on the Cisco 12008, refer to the *Cisco 12008 Gigabit Switch Router Installation and Configuration Guide*.

- New or modified commands—The following commands were added or changed in Release 11.2(9)GS4. In some cases, the commands existed in 11.2(9)GS, but were not documented. For more information, refer to the Cisco 12000 Series Gigabit Switch Routers feature module attached to this document.

  - **set card-message** command—Sets the message displayed on the LED on the front panel of one or more line cards.

  - **clear card-message** command—Clears the user-specified message that is displayed on the LED on the front panel of one or more line cards and reverts to the normal status message for the line card.

  - **show gsr** command—Displays hardware information on the Cisco 12000 series. Optionally you can display the backplane NVRAM information, including a hex dump of the NVRAM information.

  - **pos scramble-atm** command—Enables SONET payload scrambling on a POS interface. SONET payload scrambling applies a self-synchronous scrambler ($x^{43}+1$) to the Synchronous Payload Envelope (SPE) of the interface to ensure sufficient bit transition density.

  - **debug gsr errors** command—Enables the display of MBus messages if a line card fails to come up properly.

  - **debug ipc errors** command—Enables warnings and errors from the Interprocess Communication (IPC) on the line card or Gigabit Route Processor (GRP) card.

  - **debug mbus system** command—Enables the display of low-level MBus messages.

- Error Messages—The list of error messages has been updated. For more information, refer to the System Error Messages feature module.

New Features in Release 11.2(9)GS

This section briefly describes the features associated with the Cisco 12000 series including the updated features such as system error messages.

- Line cards supported on the Cisco 12000 series:

  - OC-12c/STM-4c Asynchronous Transfer Mode (ATM) line card—Provides a single 622 Mbps ATM interface with one OC-12c/STM-4 SC-duplex single or multimode SONET/SDH connection.

  - OC-12c/STM-4c Packet-Over-SONET (POS) line card—Provides a single 622-Mbps POS interface with one OC-12c/STM-4 SC-duplex SONET connection.

- Quad OC-3c/STM-1c Packet-Over-SONET (POS) line card—Provides four independent POS interfaces with four OC-3/STM-1 SC-duplex SONET connections.

Each line card has the following main components:

- Reassembly and Segmentation (ATM only)
- Transceivers
- Burst buffers
- Buffer memory
- Layer 3 switching accelerator
- Forwarding processor
- Silicon queuing engine
- Switch fabric interface
- Maintenance bus (MBus) controller
- Cisco Express Forwarding tables

- Cisco Express Forwarding (CEF)—CEF is an advanced Layer 3 switching technology for IP. CEF optimizes network performance and scalability for networks with large and dynamic traffic patterns, such as those associated with the Internet, Web-based applications, and interactive sessions. For more information, refer to the Cisco Express Forwarding feature module.

- System Error Messages—The system software sends Cisco IOS system error messages to the console (and, optionally, to a logging server on another system) during operation. Not all system error messages indicate problems with your system. Some are purely informational, while others may help diagnose problems with communications lines, internal hardware, or the system software. For more information, refer to the System Error Messages feature module.

For more information on the Cisco 12000 series and line cards, refer to the publications that accompany the hardware. Also refer to the online feature modules for a description of the new or modified Cisco IOS commands on the Cisco 12000 series.

Cisco IOS Feature Sets

The Cisco 12000 series supports only the IP Routing feature set in Cisco IOS Release 11.2 GS. Table 4 lists the features available in the IP Routing feature set.

Table 4   Features in the IP Routing Feature Set for Cisco 12000 Series GSRs

LAN Support
IP
WAN Services
PPP[1]
HDLC
WAN Optimization
Modified Deficit Round Robin (MDRR)[2]
IP Routing
Enhanced IGRP
Enhanced IGRP Optimizations
IGRP

Table 4   Features in the IP Routing Feature Set for Cisco 12000 Series GSRs (continued)

LAN Support
IS-IS
OSPF
OSPF Not-So-Stubby-Areas (NSSA)
OSPF On Demand Circuit (RFC 1793)
RIP
RIP Version 2
Interdomain Routing
BGP
BGP4[3]
EGP for Internet scale routing
Multimedia and Quality of Service
Generic traffic shaping[4]
Random Early Detection (RED)
Management
AutoInstall
SNMP
Telnet

1. PPP includes support for LAN protocols supported by the feature set, and address negotiation.

2. Modified Deficit Round Robin (MDRR) will be supported in a future release.

3. BGP4 includes soft configuration, multipath support, and prefix filtering with inbound route maps.

4. Generic traffic shaping will be supported in a future release.

Memory Requirements

Table 5 describes the memory requirements for the IP Routing feature set for the Cisco 12000 series supported by Cisco IOS Release 11.2 GS.

Cisco 12000 series are shipped with a 20-MB PCMCIA Flash memory card.

Table 5   Memory Requirements for the Cisco 12000 Series GSRs

Feature Set by Router	Image Name	Required Flash Memory	Required DRAM Memory	Release 11.2 GS Runs From
IP Routing	gsr-p-mz	20 MB Flash	64 MB DRAM	RAM

Important Notes

This section contains important information about Release 11.1 GS.

- Deferral of Images for Cisco IOS Release 11.2(19)GS7

  The Cisco 12000 series images (all gsr- images) have been deferred in Cisco IOS Release 11.2(19)GS7 due to a severe defect. The software solution for these deferred images is Cisco IOS Release 11.2(19)GS8, which is available on Cisco.com.

  In order to increase network availability, Cisco recommends that you upgrade affected IOS images with the suggested replacement software images. Cisco will discontinue manufacturing shipment of affected IOS images. Any pending order will be substituted by the replacement software images.

  ✎
  Note Please be aware that failure to upgrade the affected ios images may result in network downtime.

  The terms and conditions that governed your rights and obligations and those of Cisco, with respect to the deferred images will apply to the replacement images.

- Release 11.2(19)GS2 was not released.

- Release 11.2(19)GS1 was deferred from general distribution.

- Releases 11.2(17)GS1, 11.2(18)GS1, 11.2(18)GS2 were deferred from general distribution. These releases were replaced by Release 11.2(18)GS4.

- Release 11.2(15)GS6 was not released.

- Release 11.2(15)GS4 was not released.

- Release 11.2(15)GS1 was deferred from general distribution. It was replaced by Release 11.2(15)GS1a.

- Release 11.2(11)GS2 was deferred from general distribution.

- Release 11.2(9)GS1 through Release 11.2(9)GS3 were not released.

- Release 11.2(9)GS5 and 11.2(9)GS6 were not released.

- The **if-console** command has been changed to **attach** in Release 11.2(9)GS7.

- There is only one product number associated with Release 11.2 GS. Cisco automatically ships the latest maintenance version of Release 11.2 GS with new system orders.

- The ROM Monitor is bundled with the Cisco IOS software. You must upgrade the ROM Monitor on the GRP or line cards if you receive the following message:

```
MBUS-0-DOWNREV: Rom Monitor in slot <slot-number>
```

  To upgrade the ROM Monitor on the GRP card or on one or more line cards, perform the following tasks in privileged EXEC mode:

Task	Command
Check the current ROM Monitor version.	**show diag** [*slot-number*]
Upgrade the ROM Monitor on the GRP card. (Specify the slot-number of the GRP card.)	**upgrade rom-monitor** [*slot-number*]
Upgrade the ROM Monitor on a specific line card. (Specify the slot-number of the line card.)	**upgrade rom-monitor** [*slot-number*]

Task	Command
Upgrade the ROM Monitor on all line cards.	**upgrade rom-monitor all**
Verify that there is a new ROM Monitor version.	show **diag** [*slot-number*]

- The MBus agent ROM firmware is bundled with the Cisco IOS software. You must upgrade the MBus agent ROM firmware on the GRP card or line cards if your MBus agent ROM firmware is a random number (for example, FF.DE) or if it is not the currently released version (the current version is 1.33).

  To upgrade the MBus firmware on one or more line cards, perform the following tasks in privileged EXEC mode:

Task	Command
Check the current MBus agent software version.	**show diag** [*slot-number*]
Upgrade the MBus agent software on a specific line card. (Specify the slot-number of the line card.)	**upgrade mbus-agent-rom** [*slot-number*]
Upgrade the MBus agent software on all line cards.	**upgrade mbus-agent-rom all**
Verify that there is a new MBus agent software version.	**show diag** [*slot-number*]

- The fabric downloader is bundled with the Cisco IOS software. You must upgrade the fabric downloader on one or more line cards if you receive the following message:

```
MBUS-0-DOWNREV: Fabric downloader in slot <slot-number>
```

  To upgrade the fabric downloader on one or more line cards, perform the following tasks in privileged EXEC mode:

Task	Command
Check the current fabric downloader version.	**show diag** [*slot-number*]
Upgrade the fabric loader on a specific line card. (Specify the slot-number of the line card.)	**upgrade fabric-downloader** [*slot-number*]
Upgrade the fabric loader on all line cards.	**upgrade fabric-downloader all**
Verify that there is a new ROM Monitor version.	**show diag** [*slot-number*]

⚠ **Caution**   A Cisco 12012 router with a full complement of line cards will take 7 to 10 minutes to upgrade. Do not interrupt the upgrade during the loading process. If you power cycle the router or otherwise terminate the command before it completes, the router may become inoperable.

Release 11.2 GS Caveats

The following sections list caveats for Release 11.2 GS that apply to the Cisco 12000 series. Refer to the *Release Notes for Cisco IOS Release 11.2* publication for a list of the caveats that apply to Release 11.2. The caveats that apply to Cisco IOS Release 11.2, including Cisco IOS Release 11.2 P, apply to Release 11.2 GS.

The complete caveats against Release 11.2 are also available in the Cisco Documentation CD-ROM package. In the CD-ROM package, access the Cisco IOS 11.2 caveats in the Cisco IOS Release 11.2 database.

If you have an account on Cisco Connection Online (CCO), you can view additional caveats using the bug search tools in the Bug Toolkit, such as the Bug Navigator.

Release 11.2(19)GS8 Resolved Caveats

All caveats in this section have been resolved in Cisco IOS Release 11.2(19)GS8 but may be open in previous Cisco IOS releases.

- CSCdw78210

  Related to fixes in CSCdw65903 and outlined in:

  http://www.cisco.com/warp/public/707/cisco-malformed-snmp-msgs-pub.shtml.

  This defect may be seen when "debug snmp packets" is turned on and can result in tracebacks.

Release 11.2(19)GS7 Resolved Caveats

The caveats listed in this section are resolved in Cisco IOS Release 11.2(19)GS7 but may be open in previous releases.

- CSCdw65903

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

  http://www.cisco.com/cgi-bin/bugtool/onebug.pl?bugid=CSCdw65903

Release 11.2(19)GS5 Caveats

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(19)GS5.

- The QOC3 ATM line card will occasionally experience unexpected failure when a CSC is inserted and removed (OIR) in a redundant CSC chassis while passing high traffic rates. This problem is under investigation. To avoid this problem, do not insert and remove CSCs or shut down the QOC3 ATM line card interfaces before inserting and removing the CSCs. [CSCdk07829]

- CPUHOG error messages may occur in configurations in which a large number of frame relay subinterfaces (2000) are configured. The displayed error message is

  ```
   %SYS-3-CPUHOG: Task ran for 13688 msec (144/143), Process = Net Periodic,
  ```
  [CSCdk28177]

- IPC errors may occur when booting a Cisco 12000 GSR with 1000+ frame relay subinterfaces. [CSCdk29443]

- The **aps authentication** command introduces an character string used to authenticate each protocol message exchanged between working and protect interfaces. At initialization, if no explicit **aps auth** command is present, a default authorization string is enabled. The **no aps authentication** command is accepted but not written to NVRAM, so reloading a router configured with **no aps authentication** will cause it to switch to a default authentication string. This can cause a "bad authorization" message to be issued both by the reloaded router and its peer.

  Workaround: do not use **no aps authentication**. This command is not advisable anyway, since it increases the vulnerability of the protocol to acceptance of extraneous udp messages. [CSCdk37781]

- Using a **show version** command on a GSR line card displays "System restarted by unknown reload cause" in all cases since reload reason is stored on the RP and not the line card. [CSCdk42396]

- Commands executed on GSR line cards via **execute-on** do not recognize term length and instead run to completion without pausing output. [CSCdk66534]

- IPC errors may occur when a Cisco 12000 GSR is configured with more than 1000 subinterfaces. [CSCdk79787]

- When using the **copy tftp startup-config** command, the boot variable will not be changed. Thus, if you have a new **boot system flash** command in the configuration, it does not affect the boot variable. A reload will load the same configuration as was running before the **copy tftp startup-config** command. The workaround is to copy the new startup configuration to the running configuration, then write mem. Check the output of the **show boot** command to confirm the new boot variable is updated. [CSCdm58189]

- ChOC12 cards in a GSR report DS3 BERT errors in multiples of 65535. This is probably because of a latched 16-bit hardware error counter. In these instances legitimate telco problems exist, but the BERT counters are wrong. It is not the case that the GSR reports errors on a clean circuit or does not report errors on a bad circuit. [CSCdm59092]

- The command **show controllers fia** may not show the correct state of the fabric redundancy. [CSCdm63437]

- During lab stress testing in which an ATM subinterface was repeatedly added and removed, the router crashed while the interface was being added. [CSCdm67228]

- MTU changes on a OC-3 ATM interface is not reflected in **show interface** *interface*. The MTU change has taken effect but does not show up in the command. The new MTU size can be confirmed using the command <CmdBold>**execute-on slot** *slot-num* **show controller tofab queue** command. [CSCdm74906]

- When polling ciscoEnvMonPresent, the Cisco 12000 GSR returns the value ci, which stands for Chassis Interface but the GSR doesn't have a CI. [CSCdm91107]

- Cisco Express Forwarding (CEF) per-packet loadsharing is not supported when the inbound linecard is an Engine 2 (PSA-based) line card. A warning message appears telling the user that the feature is not supported when trying to configure per-packet load sharing. [CSCdr21358]

- On Cisco 12000 series routers, the following message may appear in the output of **show version** even after the linecard in question has been upgraded:

```
WARNING: Old Fabric Downloader in slot 1
Use "upgrade fabric-downloader" command to update the image
```

  This message persists until the router is reloaded. [CSCds11299]

- Once a day, the LC and GRP communication stalls, IPC error messages appear in the logs and CPU goes up to over 90%. It clears after a while. There is no workaround. [CSCds40400]

- GSR displays Spurious Memory Access errors after POS interface went down. [CSCds41196]

Release 11.2(19)GS4 Caveats/Release 11.2(19)GS5 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(19)GS4.

- A Cisco 12000 series router encounters a situation where a prefix is missing from one of the linecards. This situation may cause packet drops at the linecard or, in the case of an incomplete adjacency, packets sent to the RP for forwarding, which results in high CPU usage.

  Workaround: Use the **clear cef linecard** command. [CSCdk63572]

- The Cisco 12000 Gigabit Switch Router (GSR) has 4 power supplies. If any one of them is removed, the GSR generates a log message. The log message displays after 30 to 50 seconds. However, the GSR does not generate a log message if a power supply is simply turned off or if a power supply fails.

  The workaround is to log in to the router console and issue a **show env** command, which displays current status of all power supplies.

  If power supplies fail, and no logging messages are issued, it is possible that the router will shut down without notice. The planned solution is to generate a log message whenever a power supply is turned off, removed, or when it fails. [CSCdm16089]

- Under some circumstances, a Packet-over-SONET (POS) interface with Frame Relay encapsulation might have an incomplete adjacency. There is no workaround. [CSCdm79499]

- When polling ciscoEnvMonPresent, the Cisco 12000 GSR returns the value ci, which stands for Chassis Interface but the GSR doesn't have a CI. [CSCdm91107]

- When removing a loopback interface and reapplying the configuration, the message "%FIB-4-FIBIDB: Missing CEF idb for [interface] during address change" is displayed, and connectivity to that interface is no longer possible.

  A reboot is required to restore connectivity to the address associated with the interface. [CSCdp59435]

- An snmpwalk performed on the OID cardSerial 1.3.6.1.4.1.9.3.6.11.1.4 using OLD-CISCO-CHASSIS-MIB.my on Cisco 12000 series router running Cisco IOS release 11.2(18)GS03 or 12.0(8)S returns the value -1. This problem does not appear on other devices. Not all the objects in OLD-CISCO-CHASSIS-MIB.my are supported for the Cisco 12000 series router. [CSCdp94038]

- The PIM process may consume the router's memory on a Cisco 12000 series router running Cisco IOS release 11.2(15)GS1A. [CSCdr25213]

Release 11.2(19)GS3 Caveats/Release 11.2(19)GS4 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(19)GS3.

- If very long access-lists (greater than 1000 lines) are used on a Cisco router that has compiled ACLs enabled, changes or additions to the ACL may result in from the router similar to the following:

```
SLOT 0:%SYS-3-CPUHOG: Task ran for 2928 msec (35/5), Process = TurboACL, PC = 4009274C
-Traceback= 40092754 401AFED4 401AFB18 401B1474 401B2E60 401B2ED8 401B2FEC 40082128
40082114
```

In some situations, keepalive messages are not processed because of the long access lists, which results in a line protocol down state.

There is no known workaround. [CSCdr44028]

- The label forwarding table entries for VPN routes are not created properly on the GSR and VIP line cards, unless **redistribute connected** is configured for the associated VRF under **router bgp**.

The workaround is to configure **redistribute connected** on the router. [CSCdm16217]

- On a Cisco 12000 series router, the gigabit Ethernet line protocol goes down after the following message is logged:

```
SLOT 7:%LCGE-3-INTR: TX GigaTranslator external interface parity error
```

[CSCdm66791]

- Using the **clear ip bgp** or **clear ip route** may cause CPUHOG messages. The duration of the CPUHOG seems proportional to the number of routes. The problem was initially reported for a scenario of 100,000 BGP routes and 20,000 OSPF routes.

Very long CPUHOGS have a serious impact on GSRs with dual GRPs. On such systems, CPUHOGs with a duration of four seconds or more will cause a failover from primary to secondary GRP.

The workaround is to use 11.2(15)GS7 or 12.0(5)S or later, and use the new **failover timeout** command to increase the timeout value. A timeout of 8 seconds can be set as follows:

```
router# config term
router(config)# redundancy
router(config-r)# main-cpu
router(config-r-mc)# failover timeout 8000
```

IOS releases after 11.2(15)GS7 and 12.0(5)S will have an increased default value for the failover timer. [CSCdm71059]

- A Cisco 12000 GSR with dual GRPs may report %SYS-2-MALLOCFAIL from process RP Standby.

This message appears because the primary GRP has the wrong value for the size of the startup-config. When the primary GRP attempts to synchronize the startup-config with the secondary GRP, it will attempt and fail to allocate a huge buffer for the copy operation. This should not cause any operational problems, but if there is a failover event, the new primary GRP may use an obsolete version of the startup-config.

A workaround is to save the startup-config again. This should correct the primary GRP's view of the startup-config size and allow a successful autosync. [CSCdm76942]

- When a customer removes a DC power supply, this change is not reflected in the ciscoEnvMonSupplyStatusTable although a **notPresent** status exists in the ciscoEnvMonSupplyState. [CSCdm77028]

- Autonegotiation is not supported on the Cisco 12000 GSR Gigabit Ethernet line card. Routers and switches connected to the GSR GE linecard should be configured with autonegotiation and flow control off. The connected switches and routers should be configured to enter a mode that forces the Ethernet link up, which is how the Gigabit Ethernet line card operates. [CSCdp01115]

Release 11.2(18)GS4 Caveats/Release 11.2(19)GS3 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(18)GS4.

- The Cisco 12000 series does not currently support booting from a network server over the line cards. The only interface the Cisco 12000 series is able to boot from a network is the Ethernet interface (interface Ethernet/0). The correct router behavior would be to allow booting from a network server over any of the line cards. [CSCdj26114]

- On a Cisco 12000 series router, the gigabit Ethernet line protocol goes down after the following message is logged:

```
SLOT 7:%LCGE-3-INTR: TX GigaTranslator external interface parity error
```

[CSCdm66791]

Release 11.2(18)GS2 and Release 11.2(18)GS3 Caveats / Release 11.2(18)GS4 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(18)GS3.

- The Gigabit Ethernet line card displays a SCHED-3-CORRUPT message and also displays spurious access messages. [CSCdm75064]

- The ciscoEnvMonFanStatusTable returns wrong values for the Cisco 12000 series router. [CSCdm77035]

Release 11.2(18)GS1 Caveats/Release 11.2(18)GS2 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(18)GS1.

- On a Cisco 12000 series router, the gigabit Ethernet line protocol goes down after the following message is logged:

```
SLOT 7:%LCGE-3-INTR: TX GigaTranslator external interface parity error
```

[CSCdm66791]

Release 11.2(17)GS1 Caveats/Release 11.2(18)GS1 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(17)GS1.

- There is an error in the way the B2 byte of the SDH multiplex section is computed by the POS OC-3/STM-1 interface. In the output from **show controller pos1/0,** the B2 value is not updated. [CSCdm06166]

- Attempts to delete rows in the ciscoPingTable of the CISCO-PING-MIB may cause the router to halt unexpectedly. This situation occurs rarely under timing-related circumstances. [CSCdm52927]

Release 11.2(15)GS7 Caveats/Release 11.2(17)GS1 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS7.

Note   All caveats listed in "Release 11.2(17)GS1 Caveats/Release 11.2(18)GS1 Modifications" apply to Cisco IOS Release 11.2(15)GS7.

Release 11.2(15)GS5 Caveats/11.2(15)GS7 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS5.

- The **microcode reload** command allows you to issue another command immediately, which is different from the operation of the Cisco 7500 series.

  Issuing a **microcode reload** command on any of the line cards immediately returns the console command prompt. This allows you to issue a subsequent command immediately to the reloading line card. This command will not run, of course. However, for many commands, no indication is given that the command fails to run. An example of such a command is the **clear counters** command, which produces erroneous packet and error counts. [CSCdj43633]

- When secondary IP addresses are configured on the OC3 ATM line card, a large amount of memory is consumed and slowly released by the CEF process. The following workarounds will avoid this problem:

  - Install 128 Mb of memory in the router.

  - Configure VCs in small groups of a few hundred.

  - Configure no more than 1000 VCs on ports that use secondary addresses. [CSCdk26098]

- Customers have reported that the QOC3 line card does not interoperate with Lucent equipment in SDH mode. The cause is the improper setting of SS bits in the H1 byte, which should be, but are not, set to 10. The improper SS bit setting prevents the GSR from working with Lucent and Alcatel equipment that check these bits. [CSCdk41509]

- Using the **exec all sh ver** command after upgrading a LC ROM Monitor code may restart the line card. This behavior occurs with Cisco IOS Release 11.2(14)GS2. [CSCdk68544]

- The route processor will become stuck and not respond. This problem will not be encountered during the regular operation of router. The problem shows up only after if the router is configured/unconfigured repeatedly. [CSCdk76609]

- In a Cisco 12000 series router, when configuring the router for an upgrade to a 12.0S boot image, the following error may be encountered:

```
router(config)#boot bootldr bootflash:gsr-boot-mz.120-2.7.S
File bootflash:gsr-boot-mz.120-2.7.S is an image (elf) type file
```

   This will prevent you from being able to upgrade the boot image using the **boot bootldr** command. [CSCdk89159]

- A POSIP OC-12 line card may experience packet drops. This occurs when multicast packets are process switched. [CSCdk91259]

- When a **upgrade all all** command is issued on a GSR running Cisco IOS Release 11.2(15)GS1a the following messages may appear, along with some traceback messages:

```
%SYS-2-LINKED:Bad enqueue of 60A64F30 in queue 6240B068
 Process= "MBUS System", ipl= 6, pid= 6
```

   There is no workaround other than power-cycle. [CSCdm01170]

- When the MBUS ROM code is upgraded via **upgrade all all**, you may see the following message

```
Upgrading the MBUS agent rom on slot 24
timed out with no programming complete
Upgrade MBUS agent fail: Error Code 5
```

   This is not a fatal error, and does not have any operational impact. The MBUS ROM need not be upgraded. Currently **upgrade all all** has MBUS ROM upgrade built into it, which is why the messages may be seen.

   If possible, instead of using **upgrade all all**, use invidual **upgrade** *x* commands to upgrade the specific component as needed. [CSCdm01174]

- Multicast fast switching does not work properly over the loopback interface if the **ip igmp static-group** command is configured on the loopback interface. [CSCdm25028]

Release 11.2(15)GS4 Caveats/11.2(15)GS5 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS4.

- The Cisco 12000 series (GSR) router running IOS 11.2(9)GS7 has the MIB variable ciscoEnvMonTemperatureThreshold set to 0 for all instances. This means that if the temperature rises above 0 degrees, the temperature will be reported as too high. [CSCdk34141]

- Some CHOC-12/STM4-STS-3/STM1 linecards may have gone out with an EPROM programmed incorrectly. This is only a cosmetic problem where the EE_MAIN_PCA error message shows up in the **show version** command. [CSCdk93103]

- Pressing the reset button on the route processor card on a Cisco 12000 series router will cause the router to boot from the first image in flash and will ignore any **boot system** flash commands in the configuration. [CSCdm00469]

- Line card interface status indicated line "up" and line card protocol indicated "down" when the optical cable was removed from the Cisco 12000 router. This problem occurred only with the PPP encapsulation and never occurred with HDLC encapsulation. [CSCdm06342]

- With different local_pref and MED combinations and multiple paths, the deterministic-med may not result in the correct bestpath selection in certain cases.

  This problem was introduced by CSCdi69580, and impacts all images more recent than the following: 1.1(08)CA 011.002(003.002) 11.2(03.02)P 11.2(03.02)F, and 11.3, 12.0.

  The workaround is to disable **bgp deterministic-med**, to use local_pref to select paths, or to override MED when exists multiple paths exist. [CSCdm22850]

Release 11.2(15)GS3 Caveats/11.2(15)GS4 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS3.

Note All caveats listed in "Release 11.2(15)GS4 Caveats/11.2(15)GS5 Modifications" apply to Cisco IOS Release 11.2(15)GS3.

Release 11.2(15)GS2 Caveats/11.2(15)GS3 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS2.

- A GSR with Quad ATM OC-3(LC4 OC3/ATM-IR) running Cisco IOS Release 11.2(15)GS1a always shows up/up after issuing a **shut/no shut** command on the interface before the line/protocol connection between the other interface is up. After the line/protocol comes up successfully, the line status indication works without problems. [CSCdk90199]

Release 11.2(15)GS1 Caveats/11.2(15)GS2 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(15)GS1.

- APS incorrectly processes the situation in which the remote request is a FORCE and the local request is an SF on protect. It should honor the SF. It does not. Workaround: none. [CSCdk57033]

- Tunnel interface accounting is built on adjacency accounting. GSR adjacency accounting will appear in 12.0S, at which time GSR tunnel interface accounting should be retested.

  Workaround: None. [CSCdk62559]

Release 11.2(14)GS3 Caveats/11.2(15)GS1 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(14)GS3.

- On the Cisco 12000 series, ICMP ttl exceeded messages do not get sent correctly when IP unnumbered is used on the incoming interface. [CSCdk47056]

- Under certain conditions on a Cisco 12000 series router, the SNMP community string may be displayed in clear text in the crashinfo output. [CSCdk41136]

Release 11.2(14)GS1 Caveats/11.2(14)GS2 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(14)GS1.

- ATM per-VC counters may be not correct if OAM loopback over that VC is turned on. The workaround for accurate per-VC counters is not to turn on OAM loopback. [CSCdk39038]

- The VCC number field in **show interface atm** output does not decrease when a VC is removed. [CSCdk39330]

- Variable bit rate (VBR) input at less than OC-3 rates gives unexpected output rates. The fix for this problem needs a new version of SAR firmware. The firmware will be fixed by the supplier and verified. The workaround for this problem is to avoid input rates to the VBR at less than OC-3 rates. [CSCdk35813]

Release 11.2(11)GS3 Caveats/11.2(14)GS1 Modifications

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(11)GS3.

- Better crash information is needed to debug data/stack corruption crashes. The solution is to write crash information to default to bootflash:crashinfo in the RSP and flash:crashinfo in the RP. A series of **test crash** command selections are used to control and change the crashinfo collection mechanism. The crash information contains up to 32 KB in the RSP and up to 20 KB in the RP of errmsg log plus command history including configuration commands that the user enters. The crash information also contains up to 32 KB on the RSP and 20 KB on the RP for all the following information:

  - crash stack trace

  - crash context

  - stack dump at crash

  - dump memory for each register containing "valid" RAM address

  - errmsg display on invalid length of bcopy

  - two commands to "test crash"

  The **sh stack** command displays ("cat" as in UNIX) the bootflash:crashinfo file if there was a crash. The user can also use the command **copy flash tftp** to dump the ASCII file bootflash/flash:crashinfo to a server. The size is 16 KB of errmsg/command plus up to 16 KB of memory dump and other crash information. There is one 16-KB DRAM declared for this crash information collection mechanism. Only Cisco 7000 series and Cisco 12000 series routers and the RSP or GRP are activated with new crashinfo mechanism and the 16 KB. Cisco 4500 and others will see no difference. [CSCdj12951]

Release 11.2(11)GS2 and Release 11.2(11)GS1 Caveats

This section describes possibly unexpected behavior by Release 11.2 GS, up to and including Release 11.2(11)GS2.

- IP multicast is not supported for ATM line cards in the current version. The packets will not be switched but dropped at the line card. We recommend that you not use the **ip mroute distributed** command on the ATM line cards. [CSCdj72768]

- On the Cisco 12000 series, you can configure access-lists but they only take effect on packets that are passed to the RP. [CSCdj85710]

- The SONET payload type (for example, STS1, STS3c/STM1, STS12c/STM4c, etc.,) is fixed on each line card interface on Cisco 12000 series routers. As a result, the Object ID sonetPathCurrentWidth has read access only in the Cisco SONET MIB, not read-write access as specified in RFC 1595. [CSCdj57991]

Release 11.2(9)GS7 Caveats/11.2(11)GS1 Modifications

This section describes possibly unexpected behavior by Release 11.2 (9)GS7. Unless otherwise noted, these caveats apply to all 11.2 GS releases up to and including, Release 11.2(9)GS7.

- The **execute-on** EXEC command that runs on the GRP and the executing commands on the line card currently suffer the following deficiencies: cannot handle line card commands requiring input, cannot handle paging, and cannot filter out illegal line card commands. [CSCdj48044]

- IP multicast is not supported for ATM line cards in the current version. The packets will not be switched, but dropped at the line card. We recommend that you not use the **ip mroute distributed** command on the ATM line cards. [CSCdj72768]

- Due to memory fragmentation problems, a GRP with only 64 MB of memory might run out of memory (issue NOMEMORY or MALLOCFAIL errors) while carrying a full Internet routing table. [CSCdj39725]

Release 11.2(9)GS4 Caveats/11.2(9)GS7 Modifications

This section describes possibly unexpected behavior by Release 11.2(9)GS4. Unless otherwise noted, these caveats apply to all 11.2 GS releases up to and including 11.2(9)GS4.

The caveat listed in this section is resolved in release 11.2(9)GS7.

- Enabling IPC debug messages on line cards by using the **debug ipc all** command might result in the GRP pausing indefinitely while generating the output from the line card. The correct behavior would be to allow the user to disable the debugs on line cards or reload the microcode on them. We recommend that you not use **debug ipc all** commands. The possibly unexpected behavior might require the GRP to be power cycled. [CSCdj44737]

Release 11.2(9)GS Caveats/11.2(9)GS4 Modifications

This section describes possibly unexpected behavior by Release 11.2(9)GS. Unless otherwise noted, these caveats apply to all 11.2 GS releases up to and including 11.2(9)GS.

All the caveats listed in this section are resolved in release 11.2(9)GS4.

- In a redundant switch fabric configuration (for example, with two clock scheduler cards [CSC]), if the master CSC card needs to be removed, a Cisco 1200 series router currently needs to be reloaded. The master CSC card is generally in slot 17 (on the Cisco 12012). If the master CSC card is removed, all access to the switch fabric from the line cards and GRP will be lost. The correct router behavior would be to detect the removal of the CSC card and switch over to the redundant CSC card. [CSCdj43058]

- In rare cases (not well understood or easily repeatable) after a reload, the GRP fails to initialize the line cards correctly. The symptom of this defect is the GRP repeatedly displaying the following message on the console:

```
MBUS_SYS-3-NO_BUFFER: Message from slot 1 in Stream 7 dropped
```

  To verify that you are experiencing this problem, use the **show diag summary** command as shown below.

```
GSR-1#sh diag sum
SLOT 0  (RP/LC 0):
%MBUS_SYS-3-NO_BUFFER: Message from slot 1 in Stream 7 dropped
Unable to get EEPROM contents for slot 0
SLOT 1  (RP/LC 1):
Unable to get EEPROM contents for slot 1
SLOT 2  (RP/LC 2):
Unable to get EEPROM contents for slot 2
SLOT 6  (RP/LC 6):
Unable to get EEPROM contents for slot 6
SLOT 7  (RP/LC 7):
Unable to get EEPROM contents for slot 7
SLOT 8  (RP/LC 8):
%MBUS_SYS-3-NO_BUFFER: Message from slot 1 in Stream 7 dropped
%MBUS_SYS-3-NO_BUFFER: Message from slot 1 in Stream 7 dropped
Unable to get EEPROM contents for slot 8
SLOT 9  (RP/LC 9):
Unable to get EEPROM contents for slot 9
SLOT 10 (RP/LC 10):
Unable to get EEPROM contents for slot 10
```

  At the present time to recover from this problem, power cycle the router. [CSCdj45589]

- A line card might not come up when a Cisco 12000 series router boots. If the **show diag** command displays a line card to be stuck in either "Board State is In Reset (IN RSET)" or "Board State is Card Powered (PWR ON)," it might be possible to recover from this failure with the following sequence of commands:

```
 test mbus power SLOT off
 wait 10 seconds
 test mbus power SLOT on
```

  where SLOT is the slot number of the failing line card. [CSCdj47113]

- The CSCdj37195 defect is well understood and will be fixed in an upcoming release of GSR software. The problem is easy to avoid: it involves the **debug ipc all** command, which is not generally useful unless you are debugging router software problems. The problem is encountered

if, while receiving the output of **debug ipc all**, you then use the console terminal to send a break, causing the router to crash to the ROM Monitor. Subsequently booting the router might cause a condition under which messages like the following appear:

```
%MBUS_SYS-3-NO_BUFFER: Message from slot 4 in Stream 7 dropped
%MBUS_SYS-3-REASSEMBLY_ERROR: Slot = 2 Stream = 1 first packet lost
%MBUS_SYS-3-NO_BUFFER: Message from slot 4 in Stream 7 dropped
%MBUS_SYS-3-NO_BUFFER: Message from slot 4 in Stream 7 dropped
%MBUS_SYS-3-NO_BUFFER: Message from slot 9 in Stream 7 dropped
%BFRP-3-UCODETIMEOUT: Line card did not respond to image download (5)
%BFRP-3-UCODETIMEOUT: Line card did not respond to image download (11)
%MBUS_SYS-3-REASSEMBLY_ERROR: Slot = 5 Stream = 1 first packet lost
%MBUS_SYS-3-NO_BUFFER: Message from slot 4 in Stream 7 dropped
%MBUS_SYS-3-TIMEOUT: Timeout on mbus request. Dest = 5, type = 5, addr = 0x1
%MBUS-3-FAILED_READ_REGISTER: Could not read Register 20001 in slot 11
config_slot_for_redundant_fab_clk
%MBUS_SYS-3-NO_BUFFER: Message from slot 9 in Stream 7 dropped
%MBUS_SYS-3-TIMEOUT: Timeout on mbus request. Dest = 5, type = 5, addr = 0x1
-Traceback= 60122BD8 60122C84 60120978 601252FC 6012235C 601224B4 6011DF18 600C0498
600C0484
```

Typing the **show diag** command displays something similar to the following:

```
SLOT 0  (RP/LC 0):
Unable to get EEPROM contents for slot 0  MBUS Agent Software version 01.18
  Board is analyzed
  Board State is IOS Running (MSTR  RP)
%MBUS-3-NO_FABRIC_CLOCK: Slot 5 does not see any fabric clock
Card will not operate on fabric1
SLOT 1  (RP/LC 1):
Unable to get EEPROM contents for slot 1  MBUS Agent Software version 01.18
  ROM Monitor version 00.03
  Fabric Downloader version 00.0B
  Board is analyzed
  Board State is Launching IOS (IOS  STRT)
SLOT 2  (RP/LC 2):
Unable to get EEPROM contents for slot 2  MBUS Agent Software version 01.18
  ROM Monitor version 00.03
  Fabric Downloader version 00.0B
  Board is analyzed
  Board State is Launching IOS (IOS  STRT)
SLOT 4  (RP/LC 4):
Unable to get EEPROM contents for slot 4  MBUS Agent Software version 01.18
  ROM Monitor version 00.03
```

To recover from this problem, power cycle the router. [CSCdj37195]

- On a router with multiple line cards, when you reload the microcode on one of the line cards, a valid point-to-point adjacency sometimes becomes incomplete on another line card. The point-to-point adjacency re-establishes itself on the Gigabit Route Processor (GRP) and on the native line card after it comes up but still remains invalid on the other line card. The problem is that sometimes there is a race condition where the GRP fails to notify the other line cards of the point-to-point adjacency reestablishing itself. A simple workaround is to reload the adjacency from the GRP on all line cards. [CSCdj47803]

- A Cisco 12000 series router does not support more than 300 interfaces (including subinterfaces) on a single router. The number of secondary addresses is limited to 250 per interface. [CSCdj46080]

Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: http://www.cisco.com
- WWW: http://www-europe.cisco.com
- WWW: http://www-china.cisco.com
- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com.

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

Release Notes for Cisco 12000 Series Gigabit Switch Routers for Cisco IOS Release 11.2 GS ■