

# Release Notes for Cisco 1600 Series Routers for Cisco IOS Release 12.1(3)XG

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February 20, 2002

These release notes describe new features and significant software components for the Cisco 1600 Series Routers that support Cisco IOS Release Release 12.1(3)XG6. These release notes are updated as needed to describe new memory requirements, new features, new hardware support, software platform deferrals, microcode or modem code changes, related document changes, and any other important changes. Use these release notes with the *Cross-Platform Release Notes for Cisco IOS Release 12.1* located on Cisco.com and the Documentation CD-ROM.

For a list of the software caveats that apply to Release 12.1(3)XG6, refer to the section “Caveats” and to the online *Caveats for Cisco IOS Release 12.1 T* document. The caveats document is updated for every 12.1 T maintenance release and is located on Cisco Connection Online (Cisco.com) and the Documentation CD-ROM.

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# System Requirements

This section describes the system requirements for Release 12.1(3)XG6 and includes the following sections:

- Memory Requirements
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## Memory Requirements

**Table 1** Memory Requirements for Cisco 1600 Series Routers

Platforms	Feature Sets	Image Name	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs from
Cisco 1601R– Cisco 1605R	IP Feature Sets	IP Plus	c1600-sy-mz	6 MB	16 MB	RAM
		IP Plus IPSec 56	c1600-sy56i-mz	6 MB	16 MB	RAM
		IP/FW Plus IPSec 56	c1600-osy56i-mz	6 MB	24 MB	RAM
		IP/IPX/FW Plus	c1600-nosy-mz	6 MB	16 MB	RAM
		IP/IPX/AT/IBM Plus	c1600-bnr2sy-mz	8 MB	24 MB	RAM
		IP/IPX/AT/IBM/FW Plus IPSec 56	c1600-bnor2sy56i-mz	8 MB	24 MB	RAM

## Hardware Supported

Cisco IOS Release 12.1 T supports the following Cisco 1600 series routers:

- Cisco 1601-R
- Cisco 1602-R
- Cisco 1603-R
- Cisco 1604-R
- Cisco 1605-R

Cisco 1600 series routers have two memory architectures: one run-from-Flash (RFF) and one run-from-RAM (RFR). Router model names with an R are RFR routers; all other models are RFF. In this document, model names without an R refer to both RFF and RFR models, except where otherwise noted.

For detailed descriptions of the new hardware features, see “New and Changed Information” section on page 6.

**Table 2 Supported Interfaces for the Cisco 1600 Series**

Interface, Network Module, or Data Rate	Platforms Supported
1 Ethernet port	Cisco 1601–1604
1 built-in WAN port	Cisco 1601–1604
1 WAN interface-card expansion slot	Cisco 1601–1604
1 built-in serial WAN port	Cisco 1601
1 onboard 56-kbps 4-wire DSU/CSU	Cisco 1602
1 ISDN BRI S/T port	Cisco 1603
ISDN BRI U interface with a built-in NT 1 device	Cisco 1604
2 Ethernet LAN interfaces	Cisco 1601-R–1605-R
1-port ISDN BRI with S/T interface	Cisco 1601, Cisco 1602, Cisco 1601-R–1605-R
1-port synchronous/asynchronous serial	Cisco 1600 series
1-port ISDN BRI with integrated NT1 and with a U interface	Cisco 1601, 1602, Cisco 1601-R–1605-R
1-port ISDN Leased Line BRI S/T WAN interface	Cisco 1603, Cisco 1604
1-port 56/64kbps DSU/CSU WAN interface	Cisco 1600 series
1-port T1/Fractional T1 DSU/CSU WAN interface	Cisco 1600 series

## Determining the Software Release

To determine the version of Cisco IOS software running on your Cisco 1600 series router, log in to the router and enter the **show version EXEC** command:

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.1 T Software (c1600-sy-mz), Version 12.1(3)XG6, RELEASE SOFTWARE
```

## Upgrading to a New Software Release

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

[http://www.cisco.com/warp/public/cc/cisco/mkt/ios/prodlit/957\\_pp.htm](http://www.cisco.com/warp/public/cc/cisco/mkt/ios/prodlit/957_pp.htm)

## Feature Set Tables

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

Cisco IOS Release 12.1(3)XG6 supports the same feature sets as Cisco IOS Release 12.1 T, but Release 12.1(3)XG6 can include new features supported by the Cisco 1600 series routers.



### Caution

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Cisco IOS images with strong encryption (including, but not limited to 168-bit (3DES) data encryption feature sets) are subject to United States government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay due to United States government regulations. When applicable, purchaser/user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to [export@cisco.com](mailto:export@cisco.com).

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Table 3 lists the features and feature sets supported by the Cisco 1600 series routers in Cisco IOS Release 12.1(3)XG6. The table uses the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In—The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, (2) means a feature was introduced in 12.1(2)T. If a cell in this column is empty, the feature was included in the initial base release.



### Note

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These feature set tables contain only the features specific to Release 12.1(3)XG6. For a more complete list of features, see the feature set tables in the mainline release notes on Cisco.com:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121relnt/xprn121/121feats.htm>.

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Table 3 Feature List by Feature Set for the Cisco 1600 Routers

Features	In	Feature Set					
		IP Plus	IP Plus IPSec 56	IP/FW Plus IPSec 56	IP/IPX/FW Plus	IP/IPX/AT/ IBM Plus	IP/IPX/AT/ IBM/FW Plus IPSec 56
<b>Configuration Fundamentals</b>							
Circuit Interface Identification MIB	(3)	Yes	Yes	Yes	Yes	Yes	Yes
Individual SNMP Trap Support	(3)	Yes	Yes	Yes	Yes	Yes	Yes
<b>IP Multicast</b>							
Bidirectional PIM	(2)	Yes	Yes	Yes	Yes	Yes	Yes
<b>IP Routing Protocols</b>							
OSPF Flooding Reduction	(2)	Yes	Yes	Yes	Yes	Yes	Yes
<b>Management</b>							
Service Assurance Agent Enhancements		Yes	Yes	Yes	Yes	Yes	Yes
<b>WAN</b>							
Frame Relay Switching Enhancements: Shaping and Policing	(2)	Yes	Yes	Yes	Yes	Yes	Yes

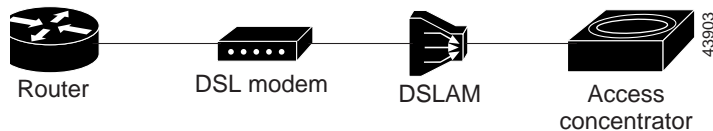
## New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 1600 series routers for Release 12.1(3)XG6.

### New Software Features in Cisco IOS Release 12.1(3)XG

Release 12.1(3)XG supports a PPP over Ethernet (PPPoE) client on the Cisco 1605-R. Multiple PCs on the LAN are supported. The following figure depicts a typical deployment scenario for PPPoE support.

*Figure 1 PPPoE Deployment Scenario*



A PPPoE session is initiated on the client side by the Cisco 1605-R. If the session has a timeout or is disconnected, the PPPoE client immediately attempts to reestablish the session.

Follow these steps to configure the router for PPPoE client support:

- 
- Step 1** Configure the vpdn group number.
- Enter the **vpdn enable** command in global configuration mode.
  - Configure the vpdn group by entering the **vpdn group tag** command.
  - Specify the dialing direction by entering the **request-dialin** command in the vpdn group.
  - Specify the type of protocol in the vpdn group by entering the **protocol pppoe** command.
- Step 2** Configure the Ethernet interface for PPPoE support.
- Configure the Ethernet interface by entering the **interface ethernet 1** command. (This is the interface to bind to the dialer.)
  - Enable PPPoE on this interface by using the command **pppoe enable**.
  - Bind the dialer to the Ethernet1 interface by using the command **pppoe-client dial-pool-number 1**.
  - Bring up the Ethernet 1 interface by using the command **no shutdown** on the interface.

- Step 3** Configure the dialer interface by entering the **int dialer *number*** command.
- Configure the IP address as negotiated by entering the **ip address negotiated** command.
  - Optional: Configure authentication for your network by entering the **ppp authentication** protocol command.
  - Configure the dialer pool number by entering the **dialer pool *number*** command.
  - Configure the dialer-group number by entering the **dialer-group *number*** command.
- Step 4** Configure a dialer list corresponding to the dialer-group by entering the **dialer-list 1 protocol ip permit** command.

If you enter the **clear vpdn tunnel pppoe** command with a PPPoE client session already established, the PPPoE client session terminates and the PPPoE client immediately tries to reestablish the session.

### Configuration Example

The following example shows the configuration of a PPPoE client.

```

vpdn enable
no vpdn logging
!
vpdn-group 1
  request-dialin
  protocol pppoe
!
!
!
interface Ethernet0
no ip add
shutdown
!
interface Ethernet1
no ip address
pppoe enable
pppoe-client dial-pool-number 1
!
interface Dialer1
ip address negotiated
ip mtu 1492
encapsulation ppp
no ip mroute-cache
dialer pool 1
dialer-group 1
ppp authentication chap
!

```

## New Software Features in Cisco IOS Release 12.1(3)T

The following new software features are supported by the Cisco 1600 series routers for Release 12.1(3)T.

### Circuit Interface Identification MIB

The Circuit Interface Description MIB feature adds support for a new Cisco enterprise MIB, used for monitoring individual circuits using SNMP. The Circuit Interface MIB (CISCO-CIRCUIT-INTERFACE-MIB) provides a MIB object you can use to provide a description of individual

circuit-based interfaces (for example, interfaces using ATM or Frame-Relay). This description is returned when linkup and linkdown SNMP traps are generated for the described interface. The Circuit Interface MIB consists of a single table, with each row being a sequence of two objects: Circuit Interface Description (cciDescr) and Circuit Interface Status (cciStatus).

The cciDescr object identifies circuits using a textual description of up to 255 user-specified characters (note that MIB objects are modified using network management system (NMS) applications, and can not be configured using the Cisco IOS command-line interface). When you create a row, a value is set for the cciDescr object. The table is indexed by ifIndex from the IF-MIB. The cciStatus is the RowStatus object for the rows in the table.

The cciStatus object can be set to only two values: createAndGo(4), which creates a new row, and destroy(6), which removes an existing row. If a row is created successfully, the cciStatus is active(1). When creating a new row, set the cciDescr object along with the cciStatus in a single **snmp set pdu** command. Only the cciDescr object can be modified if the row is already active. The other option is to delete the row first by setting the cciStatus to destroy(6) and then recreate the row with a new value for cciDescr. When creating a new row, the ifIndex is validated first. If the ifIndex value is not valid, the row is not created and an error code is returned. Similarly, when an interface is deleted, if there was a corresponding row in this table that row will be deleted automatically. After a description is created for an interface, the description (the cciDescr object) is sent along with the other varbinds as part of linkup and linkdown trap notifications.

## Individual SNMP Trap Support

The Individual SNMP Trap Support Feature adds the ability to enable or disable SNMP system management notifications (traps) individually. The SNMP traps that can be specified are *authentication-failure*, *linkup*, *linkdown*, and *coldstart*. This feature expands the functionality of the **snmp-server enable traps snmp** command. Prior to the introduction of this feature, all four trap types were enabled or disabled simultaneously by the **snmp-server enable traps snmp** command. Individual SNMP Trap Support is supported for all versions of SNMP supported by Cisco IOS software (SNMPv1, SNMPv2c, and SNMPv3).



### Note

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As both SNMP traps and informs are enabled or disabled through the use of the **snmp-server enable traps** command, all references to traps in this document also apply to informs. The term “notifications” is used to refer to both traps and informs.

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## New Software Features in Cisco IOS Release 12.1(2)T

The following new software features are supported by the Cisco 1600 series routers for Release 12.1(2)T:

### Bidirectional PIM

Bidir-PIM is a variant of the Protocol Independent Multicast (PIM) suite of routing protocols for IP multicast. In PIM, packet traffic for a multicast group is routed according to the rules of the mode configured for that multicast group. The Cisco IOS implementation of PIM supports three modes for a multicast group:

- Bidirectional mode
- Dense mode
- Sparse mode

A router can simultaneously support all three modes or any combination of them for different multicast groups. In bidirectional mode, traffic is only routed along a bidirectional shared tree that is rooted at the rendezvous point (RP) for the group. In bidir-PIM, the IP address of the RP acts as the key to having all routers establish a loop-free spanning tree topology rooted in that IP address. This IP address does not need to be a router, but can be any unassigned IP address on a network that is reachable throughout the PIM domain. Using this technique is the preferred configuration for establishing a redundant RP configuration for bidir-PIM.

Membership to a bidirectional group is signalled via explicit Join messages. Traffic from sources is unconditionally sent up the shared tree toward the RP and passed down the tree toward the receivers on each branch of the tree.

Bidir-PIM is designed to be used for many-to-many applications within individual PIM domains. Multicast groups in bidirectional mode can scale to an arbitrary number of sources without incurring overhead due to the number of sources.

Bidir-PIM is derived from the mechanisms of PIM sparse mode (PIM SM) and shares many SPT operations. Bidir-PIM also has unconditional forwarding of source traffic toward the RP upstream on the shared tree, but no registering process for sources as in PIM SM. These modifications are necessary and sufficient to allow forwarding of traffic in all routers solely based on the (\*, G) multicast routing entries. This feature eliminates any source-specific state and allows scaling capability to an arbitrary number of sources.

### Frame Relay Switching Enhancements: Shaping and Policing

The Frame Relay Switching Enhancements feature enables a router in a Frame Relay network to be used as a Frame Relay switch.

This feature includes the following Frame Relay switching enhancements:

- Traffic Shaping on Switched PVCs
- Frame Relay Switching over ISDN B Channels
- Traffic Policing on UNI DCE
- Congestion Management on Switched PVCs

Before the Frame Relay Switching Enhancements feature was introduced, routers had limited Frame Relay switching functionality. With this feature, a router acting as a virtual Frame Relay switch can be configured to do the following:

- Apply Frame Relay traffic shaping functionality to switched PVCs, enabling the router to act as a Frame Relay port concentrator.
- Support ISDN interfaces in addition to serial interfaces.
- Discard switched packets with the DE bit set when there is network congestion.
- Police incoming traffic to ensure adherence to service contracts.
- Set the Forward/Backward Explicit Congestion Notification (FECN/BECN) bits in switched packets when there is network congestion.

## OSPF Flooding Reduction

The explosive growth of the Internet has placed the focus on the scalability of Interior Gateway Protocols such as OSPF. The networks using OSPF are becoming larger every day and will continue to expand to accommodate the demand to connect to the Internet.

Internet Service Providers and customers with large networks have regularly complained that OSPF has a traffic overhead, even when the network topology is stable. By design, OSPF requires link-state advertisements (LSAs) to be refreshed as they expire after 3600 seconds. Some implementations have tried to improve the flooding by reducing the frequency to refresh from 30 minutes to around 50 minutes or so. This solution reduces the amount of refresh traffic but requires at least one refresh before the LSA expires.

The OSPF Flooding Reduction feature works by reducing unnecessary refreshing and flooding of already known and unchanged information. To achieve this reduction, the LSAs are now flooded with the higher bit set, thus making them DoNotAge (DNA) LSAs.

## New Software Features in Cisco IOS Release 12.1(1)T

The following new software feature is supported by the Cisco 1600 series routers for Release 12.1(1)T:

### Service Assurance Agent Enhancements

The Service Assurance (SA) Agent is an both an enhancement to and a new name for the Response Time Reporter (RTR) feature that was introduced in Cisco IOS Release 11.2. The feature allows you to monitor network performance between a Cisco router and a remote device (which can be another Cisco router, an IP host, or a mainframe host) by measuring key Service Level Agreement (SLA) metrics such as response time, network resources, availability, jitter, connect time, packet loss and application performance. This feature enables you to perform troubleshooting, problem analysis, and notifications based on the statistics collected by the SA Agent.

The SA Agent Enhancements feature introduces new performance measurement operations and enhancements to assist in the measurement of SLAs. With Cisco IOS Release 12.1(1)T, the SA Agent provides new capabilities that enable you to do the following:

- Measure FTP file download response time using the new FTP operation.
- Monitor one-way latency reporting through enhancements to the Jitter operation.
- Configure a new option for the DHCP operation.
- Manually enable a responder port.

- Verify data for the UDPEcho operation.
- Configure new options for the **rtr schedule** command.
- Restart an operation.

## Limitations and Restrictions

### MIBs

Old Cisco Management Information Bases (MIBs) will be replaced in a future release. Currently, OLD-CISCO-\* MIBs are being converted into more scalable MIBs—without affecting existing Cisco IOS products or NMS applications. You can update from deprecated MIBs to the replacement MIBs as shown in Table 4.

**Table 4** *Deprecated and Replacement MIBs*

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB CISCO-QUEUE-MIB
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBs)
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB



**Note**

*Cisco Management Information Base (MIB) User Quick Reference* is no longer published. If you have an account with Cisco.com, you can find the current list of MIBs supported by Cisco. To reach the *Cisco Network Management Toolkit*, go to Cisco.com, press **Login**, and click to **Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

## Important Notes

The following sections contain important notes about Cisco IOS Release 12.1 T that can apply to the Cisco 1600 series routers.

### Caveat CSCdr91706 and IOS HTTP Vulnerability

A defect in multiple releases of Cisco IOS software causes a Cisco router or switch to halt and reload if the IOS HTTP service is enabled and you browse to `http://router-ip/anytext?/` and enter the enable password when it is requested. This defect can be exploited to produce a denial of service (DoS) attack. This vulnerability can only be exploited if the enable password is known or not set.

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

The vulnerability has been corrected and Cisco is making fixed releases available for free to replace all affected IOS releases. Cisco urges all customers to upgrade to releases that are not vulnerable to this defect as listed in the complete advisory, which is available at: <http://www.cisco.com/warp/public/707/ioshttpserverquery-pub.shtml>. You are strongly encouraged to read the complete advisory.

## Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. All caveats in Cisco IOS Release 12.1 T are also in Cisco IOS Release 12.1(3)XG6.

For information on caveats in Cisco IOS Release 12.1 T, see *Caveats for Cisco IOS Release 12.1 T*. All caveats in Cisco IOS Release 12.1 are also in Cisco IOS Release 12.1 T. For information on caveats in Cisco IOS Release 12.0, see *Caveats for Cisco IOS Release 12.1*, which lists severity 1 and 2 caveats and is located on Cisco.com and the Documentation CD-ROM.



#### Note

If you have an account with Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in to Cisco.com and click **Service & Support: Technical Assistance Center: Tool Index: Bug Toolkit**. Another option is to go to [http://www.cisco.com/cgi-bin/Support/Bugtool/launch\\_bugtool.pl](http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl).

## Resolved Caveats - Release 12.1(3)XG6

This section describes unexpected behavior that is fixed in Release 12.1(3)XG6.

### Management

#### 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>

## Unresolved Caveats - Release 12.1(3)XG4

This section describes possibly unexpected behavior by Release 12.1(3)XG4, specific to the Cisco 1600 series routers. Only severity 1 and 2 caveats are included.

### CSCds04747

Connection setup improvements.

### CSCds32217

D-write community string readable with read-only community, Cisco IOS.

## Related Documentation

The following sections describe the documentation available for the Cisco 1600 series routers. These documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, feature modules, and other documents.

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

Use these release notes with these documents:

- Release-Specific Documents
- Platform-Specific Documents
- Feature Modules
- Cisco IOS Software Documentation Set

## Release-Specific Documents

The following documents are specific to Cisco IOS Release 12.1 and are located on Cisco.com and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.1*

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Cross-Platform Release Notes**

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

**Technical Documents**

- *Caveats for Cisco IOS Release 12.1*

See *Caveats for Cisco IOS Release 12.1* and *Caveats for Cisco IOS Release 12.1 T*, which contain caveats applicable to all platforms for all maintenance releases of Cisco IOS Release 12.1 and Release 12.1 T.

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Caveats**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Caveats**



**Note** If you have an account with Cisco.com, you can also use the Bug Toolkit to find select caveats of any severity. To reach the Bug Toolkit, log in to Cisco.com and click **Service & Support: Technical Assistance Center: Tool Index: Bug Toolkit**. Another option is to go to [http://www.cisco.com/cgi-bin/Support/Bugtool/launch\\_bugtool.pl](http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl).

## Platform-Specific Documents

These individual and groups of documents are available for the Cisco 1600 series routers on Cisco.com and the Documentation CD-ROM:

- *Quick Start Guides*
- *Cisco 1600 Series Hardware Installation Guide*
- *Cisco 1600 Series Software Configuration Guide*
- Cisco 1600 series router configuration notes
- Release notes for Cisco 1600 series routers
- Regulatory compliance and safety information for the Cisco 1600 series
- *WAN Interface Cards Hardware Installation Guide*
- *Cisco 1600 Fast Step Quick Start Guide*

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1600 Series Routers**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1600 Series Routers**

## Feature Modules

Feature modules describe new features supported by Cisco IOS Release 12.1 T and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: New Feature Documentation**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: New Feature Documentation**

## Feature Navigator

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a particular set of features and which features are supported in a particular Cisco IOS image. Feature Navigator is available 24 hours a day, 7 days a week.

To access Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, e-mail the Contact Database Administration group at [cdbadmin@cisco.com](mailto:cdbadmin@cisco.com). If you do not have an account on Cisco.com, go to <http://www.cisco.com/register> and follow the directions to set up an account.

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

Feature Navigator is updated when major Cisco IOS software releases and technology releases occur. You can access Feature Navigator at the following URL:

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

## Cisco IOS Software Documentation Set

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

### Documentation Modules

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

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

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Configuration Guides and Command References**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Configuration Guides and Command References**

## Cisco IOS Release 12.1 Documentation Set

Table 5 describes the contents of the Cisco IOS Release 12.1 software documentation set, which is available in electronic form and in printed form ordered.



Note

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

On Cisco.com at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1**

**Table 5** Cisco IOS Software Release 12.1 Documentation Set

Books	Chapter Topics
<ul style="list-style-type: none"> <li><i>Cisco IOS Configuration Fundamentals Configuration Guide</i></li> <li><i>Cisco IOS Configuration Fundamentals Command Reference</i></li> </ul>	Configuration Fundamentals Overview Using the Command-Line Interface (CLI) Using Configuration Tools Configuring Operating Characteristics Managing Connections, Menus, and System Banners Using the Cisco Web Browser Using the Cisco IOS File System Modifying, Downloading, & Maintaining Configuration Files Loading and Maintaining System Images Maintaining Router Memory Rebooting a Router Configuring Additional File Transfer Functions Monitoring the Router and Network Troubleshooting a Router Performing Basic System Management System Management Using System Controllers Web Scaling Using WCCP Managing Dial Shelves

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i></li> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Overview of Apollo Domain, Banyan VINES, DECNET, ISO CLNS, and XNS</li> <li>Configuring Apollo Domain</li> <li>Configuring Banyan VINES</li> <li>Configuring DECnet</li> <li>Configuring IOS CLNS</li> <li>Configuring XNS</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i></li> <li>• <i>Cisco AppleTalk and Novell IPX Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>AppleTalk and Novel IPX Overview</li> <li>Configuring AppleTalk</li> <li>Configuring Novell IPX</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume I</i></li> <li>• <i>Cisco Bridging and IBM Networking Command Reference, Volume II</i></li> </ul>	<ul style="list-style-type: none"> <li>Overview of SNA Internetworking</li> <li>Overview of Bridging</li> <li>Configuring Transparent Bridging</li> <li>Configuring Source-Route Bridging</li> <li>Configuring Token Ring Inter-Switch Link</li> <li>Configuring Token Ring Route Switch Module</li> <li>Overview of IBM Networking</li> <li>Configuring Remote Source-Route Bridging</li> <li>Configuring Data-Link Switching Plus+</li> <li>Configuring Serial Tunnel and Block Serial Tunnel</li> <li>Configuring LLC2 and SDLC Parameters</li> <li>Configuring IBM Network Media Translation</li> <li>Configuring Frame Relay Access Support</li> <li>Configuring NCIA Server</li> <li>Configuring the Airline Product Set</li> <li>Configuring DSPU and SNA Service Point Support</li> <li>Configuring SNA Switching Services</li> <li>Configuring Cisco Transaction Connection</li> <li>Configuring Cisco Mainframe Channel Connection Adapters</li> <li>Configuring CLAW and TCP/IP Offload Support</li> <li>Configuring CMPC and CSNA</li> <li>Configuring CMPC+</li> <li>Configuring the TN3270 Server</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Dial Services Configuration Guide: Terminal Services</i></li> <li>• <i>Cisco IOS Dial Services Configuration Guide: Network Services</i></li> <li>• <i>Cisco IOS Dial Services Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Large-Scale Dial Solutions</li> <li>Cost-Control Solutions</li> <li>Virtual Private Networks</li> <li>X.25 on ISDN Solutions</li> <li>Telco Solutions</li> <li>Dial-Related Addressing Services</li> <li>Internetworking Dial Access Scenarios</li> <li>Preparing for Dial Access</li> <li>Modem Configuration and Management</li> <li>ISDN and Signalling Configuration</li> <li>PPP Configuration</li> <li>Dial-on-Demand Routing Configuration</li> <li>Dial-Backup Configuration</li> <li>Terminal Service Configuration</li> </ul>

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Interface Configuration Guide</i></li> <li>• <i>Cisco IOS Interface Command Guide</i></li> </ul>	Interface Configuration Overview Configuring LAN Interfaces Configuring Serial Interfaces Configuring Logical Interfaces
<ul style="list-style-type: none"> <li>• <i>Cisco IOS IP and IP Routing Configuration Guide</i></li> <li>• <i>Cisco IOS IP and IP Routing Command Reference</i></li> </ul>	IP Overview Configuring IP Addressing Configuring DHCP Configuring IP Services Configuring Mobile IP Configuring On-Demand Routing Configuring RIP Configuring IGRP Configuring OSPF Configuring IP Enhanced IGRP Configuring Integrated IS-IS Configuring BGP Configuring Multicast BGP (MBGP) Configuring IP Routing Protocol-Independent Features Configuring IP Multicast Routing Configuring Multicast Source Discovery Protocol Configuring PGM Router Assist Configuring Unidirectional Link Routing Using IP Multicast Tools
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Multiservice Applications Configuration Guide</i></li> <li>• <i>Cisco IOS Multiservice Applications Command Reference</i></li> </ul>	Multiservice Applications Overview Configuring Voice over IP Configuring Gatekeepers (Multimedia Conference Manager) Configuring Voice over Frame Relay Configuring Voice over ATM Configuring Voice over HDLC Configuring Voice-Related Support Features Configuring PBX Signaling Configuring Store and Forward Fax Configuring Video Support Configuring Head-End Broadband Access Router Features Configuring Subscriber-End Broadband Access Router Features Configuring Synchronized Clocking

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> <li>• <i>Cisco Quality of Service Solutions Configuration Guide</i></li> <li>• <i>Cisco IOS Quality of Service Solutions Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Quality of Service Overview</li> <li>Classification Overview</li> <li>Configuring Policy-Based Routing</li> <li>Configuring QoS Policy Propagation via Border Gateway Protocol</li> <li>Configuring Committed Access Rate</li> <li>Congestion Management Overview</li> <li>Configured Weighted Fair Queueing</li> <li>Configuring Custom Queueing</li> <li>Configuring Priority Queueing</li> <li>Congestion Avoidance Overview</li> <li>Configuring Weighted Random Early Detection</li> <li>Policing and Shaping Overview</li> <li>Configuring Generic Traffic Shaping</li> <li>Configuring Frame Relay and Frame Relay Traffic Shaping</li> <li>Signalling Overview</li> <li>Configuring RSVP</li> <li>Configuring Subnetwork Bandwidth Manager</li> <li>Configuring RSVP-ATM Quality of Service Internetworking</li> <li>Link Efficiency Mechanisms Overview</li> <li>Configuring Link Fragmentation and Interleaving for Multilink PPP</li> <li>Configuring Compressed Real-Time Protocol</li> <li>IP to ATM CoS Overview</li> <li>Configuring IP to ATM CoS</li> <li>QoS Features for Voice Introduction</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Security Configuration Guide</i></li> <li>• <i>Cisco IOS Security Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>TACACS+ Commands</li> <li>Access Control Lists: Overview and Guidelines</li> <li>Cisco Secure Integrated Software Firewall Overview</li> <li>Configuring Lock-and-Key Security (Dynamic Access Lists)</li> <li>Configuring IP Session Filtering (Reflexive Access Lists)</li> <li>Configuring TCP Intercept (Prevent Denial-of-Service Attacks)</li> <li>Configuring Context-Based Access Control</li> <li>Configuring Cisco Secure Integrated Software Intrusion Detection System</li> <li>Configuring Authentication Proxy</li> <li>Configuring Port to Application Mapping</li> <li>IP Security and Encryption Overview</li> <li>Configuring IPSec Network Security</li> <li>Configuring Certification Authority Interoperability</li> <li>Configuring Internet Key Exchange Security Protocol</li> <li>Configuring Passwords and Privileges</li> <li>Neighbor Router Authentication: Overview and Guidelines</li> <li>Configuring IP Security Options</li> </ul>

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Switching Services Configuration Guide</i></li> <li>• <i>Cisco IOS Switching Services Command Reference</i></li> </ul>	Configuring MPLS Configuring IP Multilayer Switching Configuring IP Multicast Multilayer Switching Configuring IPX Multilayer Switching Configuring Multicast Distributed Switching Routing Between VLANs Overview Configuring Routing Between VLANs with ISL Encapsulation Configuring Routing Between VLANs with IEEE 802.10 Encapsulation Configuring Routing Between VLANs with IEEE 802.1Q Encapsulation LAN Emulation Overview Configuring LAN Emulation Configuring Token Ring LANE MPOA Overview Configuring the MPOA Client Configuring the MPOA Server Configuring Token Ring LANE for MPOA
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Wide-Area Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Wide-Area Networking Command Reference</i></li> </ul>	Wide-Area Networking Overview Configuring ATM Frame Relay Frame Relay-ATM Internetworking Configuring SMDS Configuring X.25 and LAPB
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Configuration Guide Master Index</i></li> <li>• <i>Cisco IOS Command Reference Master Index</i></li> <li>• <i>Cisco IOS Command Summary</i></li> <li>• <i>Cisco IOS Debug Command Reference</i></li> <li>• <i>Cisco IOS Dial Services Quick Configuration Guide</i></li> <li>• <i>Cisco IOS New Features Index</i> (Cisco.com and Documentation CD only)</li> <li>• <i>Cisco IOS System Error Messages</i></li> </ul>	

**Note**

*Cisco Management Information Base (MIB) User Quick Reference* is no longer published. If you have an account with Cisco.com, you can find the current list of MIBs supported by Cisco. To reach the *Cisco Network Management Toolkit*, go to Cisco.com, press **Login**, and click to **Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

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Language	E-mail Address
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Kanji (Japanese)	<a href="mailto:japan-tac@cisco.com">japan-tac@cisco.com</a>
Hangul (Korean)	<a href="mailto:korea-tac@cisco.com">korea-tac@cisco.com</a>
Spanish	<a href="mailto:tac@cisco.com">tac@cisco.com</a>
Thai	<a href="mailto:thai-tac@cisco.com">thai-tac@cisco.com</a>

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[http://www.cisco.com/public/technotes/tech\\_sw.html](http://www.cisco.com/public/technotes/tech_sw.html)

This URL is subject to change without notice. If it changes, point your Web browser to Cisco.com, press **Login**, and click on this path: **Technical Assistance Center: Technical Tips**.

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- Sample Configurations—Provides actual configuration examples that are complete with topology and annotations.

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