New and Changed Information

This section lists the new hardware and software features that are supported in Cisco IOS Release 12.4T and contains the following sections:

Note A cumulative list of all new and existing features supported in this release, including platform and software image support, can be found in Cisco Feature Navigator at http://www.cisco.com/go/cfn.

New Hardware Features Supported in Cisco IOS Release 12.4(24)T

This section describes new and changed features in Cisco IOS Release 12.4(24)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(24)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

Cisco 800 Broadband Series Routers

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/products/hw/routers/ps380/tsd_products_support_series_home.html

HWIC-1FE and HWIC-2FE

For detailed information about these interface cards, see the following document:

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/fe_hwic.html

HWIC-1GE-SFP

For detailed information about this interface card, see the following document:

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/ge_hwic.html

NM-1FE-SMF

For detailed information about this network module, see the following document:

http://www.cisco.com/en/US/docs/routers/access/interfaces/nm/hardware/installation/guide/ConntEth.html

New Software Features Supported in Cisco IOS Release 12.4(24)T

This section describes new and changed features in Cisco IOS Release 12.4(24)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(24)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

BGP Support for 4-Byte ASN

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_overview.html

Call Home

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/routers/7200/configuration/feature_guides/callhome_7200.html

Communications Manager Express 7.1/Survivable Remote Site Telephony 7.1

For detailed information about this feature, see the following documents:

http://www.cisco.com/en/US/docs/voice_ip_comm/cusrst/feature/guide/srst71ft.html

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmeadm.html

DHCP—DHCPv6 Individual

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-dhcp.html

End of Life of Distributed Director

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_dd_eol_24t.html

FPG: Endpoint Agnostic Port Allocation

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/ipaddr/configuration/guide/iadnat_endpointagnostic.html

IKE Responder-Only Mode

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ike_respond_only.html

Mobile IP—Policy and Application Based Routing for MR Multipath

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/ipmobility/configuration/guide/imo_multipath.html

Multi-VRF Selection Using Policy Based Routing (PBR)

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_mltvrf_slct_pbr.html

PfR—Protocol Independent Route Optimization (PIRO)

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/oer/configuration/guide/oer-trf_rte_ctl.html

Secure Neighbor Discovery

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-first_hop_security.html

SIP—Ability to Send a SIP Registration Message on a Border Element

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb_book/vb_book.html

SIP—RSVP Preconditions for Video Gateway

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/sip_cg-rsvp.html

Voice Gateway Enhancements

For detailed information about this feature, see the following documents:

http://www.cisco.com/en/US/docs/routers/access/as5350xm/software/configuration/guide/12_4_24T/12_4_24t_book.html

http://www.cisco.com/en/US/products/ps9890/products_installation_and_configuration_guides_list.html

Web Services Management Agent

For detailed information about this feature, see the following document:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cfg_wsma.html

New Hardware Features Supported in Cisco IOS Release 12.4(22)T

This section describes new and changed features in Cisco IOS Release 12.4(22)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(22)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed

does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

Cisco IAD2435-8FXS

The Cisco IAD2435-8FXS Integrated Access Device is a fixed configuration platform and comes with the following hardware and support for industry standard voice protocols like SIP, MGCP, and H.323:

- 1 T1/E1 WAN Port
- 8FXS Voice Ports
- 2 10/100Mbps Ethernet Ports
- 1 Console/Aux Port

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/hw/gatecont/ps887/products_installation_and_configuration_guides_list.html

Cisco VG202 and Cisco VG204 Voice Gateways

The Cisco VG202 and Cisco VG204 voice gateways are analog voice gateways for use in the service provider, commercial and Enterprise markets. The Cisco VG202 and Cisco VG204 voice gateways provide 2 and 4 FXS analog voice interfaces to connect to analog phones, fax machines and analog voice modems.

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/hw/gatecont/ps2250/products_installation_and_configuration_guides_list.html

Cisco VDG 1T3 Voice Gateway

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/ps9890/tsd_products_support_series_home.html

NME-IPS-K9

For detailed information about this feature, see the following:

Configuring the Cisco Intrusion Prevention System Sensor Using the Command Line Interface 6.1 found at http://www.cisco.com/en/US/docs/security/ips/6.1/configuration/guide/cli/cliguide.html

Installing and Using Cisco Intrusion Prevention System Device Manager 6.1 found at http://www.cisco.com/en/US/docs/security/ips/6.1/configuration/guide/idm/idmguide.html

Installing and Using Cisco Intrusion Prevention System Manager Express 6.1 found at http://www.cisco.com/en/US/docs/security/ips/6.1/configuration/guide/ime/imeguide.html

Release Notes for Cisco Intrusion Prevention System 6.1(1)E1 and E2 found at http://www.cisco.com/en/US/docs/security/ips/6.1/release/notes/17173_01.html

New Software Features Supported in Cisco IOS Release 12.4(22)T

This section describes new and changed features in Cisco IOS Release 12.4(22)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(22)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

3G Mobile Video Contact Center

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/video/milticomm/3g324m.html

AAA Broadcast Accounting Support for GGSN

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_aaa__brcast_acct_spt.html

ACL Syslog Correlation

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_acl_syslog.html

Application Performance Assurance Network Module

Cisco Application Performance Assurance (NME-APA) lets you manage traffic by enabling or disabling the flow of packets through the router and the service module. There are two interfaces to configure for traffic management; the router interface and the service module interface.

Use the **service-module apa traffic-management [monitor | inline]** to configure the traffic management mode on the router interface.

- **Monitor** mode will copy the packet and designate the copy as the one forwarded to NME-APA.
- **Inline** mode will send the packet to NME-APA, rather than send a copy of the packet to NME-APA. Once NME-APA has finished processing the packet, it will send it back to the router.

Use the Application Performance Assurance (APA) graphical user interface (GUI) to configure the service module interface.

http://www.cisco.com/en/US/docs/cable/serv_exch/serv_control/broadband_app/apa/2.0.0/nme/user/guide/NME-APA_User_Guide.html

Call Hold/Resume for Shared Lines for SCCP Analog Ports

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/fxs/configuration/guide/fsxholdres.html

CallBack on Busy for Analog Phones on Cisco Voice Gateways

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/fxs/configuration/guide/fxscbbusy.html

CDR Support for SRST Operational Mode, CME Call Hold Duration and Shared Line Identification

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cdr/developer/guide/cdrdefs.html

CEoIP—Clock Source Switch-Over to Internal

The CEoIP—Clock Source Switch-Over to Internal feature introduces the **clock-switchover** and **emulation-mode** commands. See the *Cisco IOS Interface and Hardware Component Command Reference* for information about these commands.

CEoIP—Unidirectional Support

The CEoIP—Unidirectional Support feature introduces the **clock-switchover** and **emulation-mode** commands. See the *Cisco IOS Interface and Hardware Component Command Reference* for information about these commands.

Certificate IP Address Extension Support

The Certificate IP Address Extension Support feature enables X.509 IP address extensions as detailed in RFC 3779, *X.509 Extensions for IP Addresses and AS Identifiers.* See RFC 3779, which defines two X.509 v3 certificate extensions, for more specific information. The following commands were introduced or modified by this feature: **ip-extension**, **show crypto pki certificates**, and **show crypto pki trustpoints**. For detailed information about the commands that are introduced or modified by the Certificate IP Address Extension Support feature, see the *Cisco IOS Security Command Reference*:

http://www.cisco.com/en/US/docs/ios/security/command/reference/sec_book.html

Cisco IOS Firewall Support for TRP

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_fwll_trp.html

Cisco IOS SSL VPN Internationalization

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

Cisco Unified Communications Trusted Firewall Control

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/feature/guide/TrustedFirewallControll.html

DC Voltage Based VMWI for SCCP Controlled Analog Ports

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/fxs/configuration/guide/fxsdcvmwi.html

Embedded Event Manager (EEM) 3.0

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_eem_overview.html

Flexible Access Code

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/fxs/configuration/guide/fxssccpsplmft.html

Flexible Netflow—IPv4 Multicast Statistics Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cgf-mcast.html

Flexible Netflow—Layer 2 Fields

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cust_fnflow_rec_mon.html

Flexible Netflow—MPLS Egress NetFlow

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netflow/configuration/guide/get_start_cfg_nflow.html

Flexible Netflow—Netflow V5 Export Protocol

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_de_fnflow_exprts.html

Flexible Netflow—Top N Talkers Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cgf-topn.html

GET VPN Phase 1.2

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_encrypt_trns_vpn.html

GET VPN Time-Based Anti-Replay on VSA

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_encrypt_trns_vpn.html

GPRS: Gateway Support Node (GGSN) R8.0

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4/12_4x/12_4_15xq/ggsn8_0/cfg/ggsn80_12415xq.html

Lawful Intercept (LI)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_lawful_intercept.html

Per Tunnel QoS

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_per_tunnel_qos.html

QoS: HQF Multiple Policy Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/qos_hqf_mply_support.html

RSVP Preconditions for Audio on SIP-TDM Gateway and Cisco Unified Communications Manager Express

The RSVP Preconditions for Audio on SIP-TDM Gateway and Cisco Unified Communications Manager Express (Cisco Unified CME) feature enhances RSVP precondition support (RFC 3312 and RFC 4032). This enhancement to Cisco IOS SIP-TDM gateways enables RSVP precondition interoperability with both Cisco Unified Communications Manager and Cisco Unified Customer Voice Portal. Additionally, the RSVP preconditions for audio feature is now supported on SIP trunks for SCCP line-side Cisco Unified CME devices.

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/sip_cg-rsvp.html

SCCP Meet-Me Conference

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/fxs/configuration/guide/fxssccpsplmft.html

SIP Diversion Header Enhancements

The SIP Diversion Header Enhancements feature allows Cisco IOS time-division multiplexing (TDM) gateways and Cisco Unified Communications Manager Express (Cisco Unified CME) to populate a Session Initiation Protocol (SIP) Diversion Header with the domain name or IP address of a registrar in place of the IP address of the gateway or Cisco Unified CME. Use the **registrar** and **host-registrar** commands to configure a gateway or Cisco Unified CME to use the domain name or IP address of an external registrar in the diversion header of outgoing invites.

The SIP Diversion Header Enhancements feature also adds support for pass-through of single or multiple SIP Diversion Headers for SIP-SIP calls across a Cisco Unified Border Element. You can choose transparent pass-through (default) for SIP Diversion Headers in a Cisco Unified Border Element or you can configure address hiding using the **address-hiding** command.

For more information on SIP Diversion Headers, see the following:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_programming_reference_guide_chapter09186a0080087351.html

The **host-registrar** command was introduced by this feature.

For detailed information about all commands used to configure the SIP Diversion Header Enhancements feature, see the *Cisco IOS Voice Command Reference*:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html

SIP History INFO

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/sip_cg-msg_tmr_rspns.html

SIP Multicast Music on Hold (MoH)

The Session Initiation Protocol (SIP) Multicast Music on Hold (MoH) feature allows the SIP gateway to subscribe to multicast music on hold when the SIP gateway is put on hold by the Cisco Unified Communications Manager.

When a VoIP phone puts a call on hold, the Cisco Unified Communications Manager asks the MoH server to stream Real-Time Transport Protocol (RTP) packets on a preconfigured multicast address. The Cisco Unified Communications Manager also sends a midcall invite with the “recv-only” attribute and multicast address to the SIP gateway. The SIP gateway subscribes to this multicast address. RTP packets are received from the MoH server and relayed by the SIP gateway to the voice interfaces.

When the VoIP phone resumes the call, the SIP-Service Provider Interface (SPI) instructs the multicast MoH server to unsubscribe from the multicast group. The IP layer drops any received multicast packets. The two-way audio channel is reestablished between the plain old telephone system (POTS) phone and the VoIP phone.

For more information on the Music on Hold features in Cisco Unified Communications Manager, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/admin/7_0_1/ccmcfg/b04mohas.html

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/admin/7_0_1/ccmcfg/b04mohfx.html

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/admin/7_0_1/ccmcfg/b04mohsv.html

http://www.cisco.com/en/US/docs/ios/voice/cminterop/configuration/guide/vc_ucm_mgcp_gw.html#wp1063184

The following commands are associated with the SIP Multicast Music on Hold feature:

- **ccm-manager music-on-hold**
- **cm-manager music-on-hold bind**
- **debug ccm-manager music-on-hold**
- **show ccm-manager music-on-hold**

The **ccm-manager music-on-hold** command enables the multicast MoH feature. The feature is turned off by default. The **ccm-manager music-on-hold bind** command binds the multicast music-on-hold feature to a designated interface, which decreases bandwidth usage. The **debug ccm-manager music-on-hold** command enables debugging. The **show ccm-manager music-on-hold** command displays media information.

For detailed information about the commands associated with the SIP Multicast Music on Hold feature, see the Cisco IOS Voice Command Reference:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html

Note SIP Multicast Music on Hold (MoH) is not supported on Cisco AS5400XM or Cisco AS5350XM (or any Cisco AS5xxx) platform.

SIP SRTP Fallback to Nonsecure RTP for CUBE

The SIP SRTP Fallback to Nonsecure RTP feature enables a Cisco IOS SIP gateway to fall back from SRTP to RTP by accepting or sending an RTP/AVP(RTP) profile in response to an RTP/SAVP(SRTP) profile. This feature also allows inbound and outbound SRTP calls with nonsecure SIP signaling schemes (such as SIP URL) and provides the administrator the flexibility to configure TLS, IPsec, or any other security mechanism used in the lower layers for secure signaling of crypto attributes. This functionality was extended to the Cisco Unified Border Element (CUBE) in Cisco IOS Release 12.4(22)T.

For more information about configuring SRTP fallback and negotiation, see the **srtp**, **srtp negotiate**, and **voice-class sip srtp negotiate** commands in the Cisco IOS Voice Command Reference at http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html.

SIT Detection and Reporting

The SIT Detection and Reporting feature provides detection of the eight U.S. special information tones (SITs) and reporting of the detected SIT with a preassigned disconnect cause code for disconnect supervision. This capability is supported for analog FXO trunk and T1/E1 channel-associated signaling (CAS) FXO loop-start. The SIT reporting complies with standard Q.850 messages in order for fax servers to uniquely identify each condition.

The SIT detection and reporting feature enabled by the **supervisory sit us** command is supported only on C5510 digital signal processors (DSPs). No other DSPs support this feature.

For more information, see the **supervisory sit us** command in the *Cisco IOS Voice Command Reference*:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_s12.html#wp1201855

Unified Communications Manager Express 7.0(1) Localization Configuration Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmelocal.html

VRF Support on Cisco Unified Communications Manager Express, Survivable Remote Site Telephony and Secure VRF Traversal for Audio Calls

The Virtual Route Forwarding (VRF) feature divides a physical router into multiple logical routers, each having its own set of interfaces and routing and forwarding tables. Adding VRF awareness to voice gateways allows a voice gateway to exist in the same router as a customer edge (CE) or provider edge (PE) WAN router.

New Software Features Supported in Cisco IOS Release 12.4(20)T1

This section describes new and changed features in Cisco IOS Release 12.4(20)T1. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(20)T1. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

Delayed Offer to Early Offer Translation for SIP Calls

The Delayed Offer to Early Offer Translation for SIP Calls feature alters the default configuration of the Cisco UBE from not distinguishing SIP Delayed-Offer to Early-Offer call flows to forcing the Cisco UBE to generate an Early-Offer with the configured codecs for an incoming Delayed-Offer INVITE.

For detailed information about the Delayed Offer to Early Offer Translation for SIP Calls feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html#wpxref72388

IP SLAs RTP-Based VoIP Operation

The IP Service Level Agreements (SLAs) Real-Time Transport Protocol (RTP)-Based Voice over IP (VoIP) Operation feature provides the capability to set up and schedule a test call and use voice gateway digital signal processors (DSPs) to gather network performance-related statistics for the call. Available statistical measurements for VoIP networks include round-trip time (RTT), jitter, packet loss, Mean Opinion Score for Conversational Quality (MOS-CQ), and Mean Opinion Score for Listening Quality (MOS-LQ).

In Cisco IOS Release 12.4(4)T, support for the IP SLAs RTP-Based VoIP Operation feature was introduced on several Cisco platforms. In Cisco IOS Release 12.4(20)T1, support for the IP SLAs RTP-Based VoIP Operation feature is made available on the Cisco IAD2430 series integrated access devices and the Cisco VG224 voice gateway (VG). Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

For detailed information about the IP SLAs RTP-Based VoIP Operation feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_rtp_voip.html

New Hardware Features Supported in Cisco IOS Release 12.4(20)T

This section describes new and changed features in Cisco IOS Release 12.4(20)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(20)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

AIM-IPS-K9

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/security/ips/6.0/installation/guide/hwguide.html

Cisco 1805 Cable Router

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/1800/1805/hardware/installation/guide/1805hwgd.html

Cisco 1860 Series Router

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/1800/1861/hardware/quick/guide/1861qsg.html

Cisco 800 Broadband Series Routers—Cisco 861, Cisco 881, Cisco 881G, Cisco 888, Cisco 888G, Cisco IAD881F, Cisco IAD881B, Cisco SRST881, Cisco IAD888F, Cisco IAD888B, Cisco SRST888

For detailed information about this feature, see the following:

http://cisco.com/en/US/products/hw/routers/ps380/tsd_products_support_series_home.html

Cisco Secure Router 500 Series: Cisco SR520-FE-K9, Cisco SR520W-FE-K9, Cisco SR520-ADSL-K9, Cisco SR520W-ADSL-K9, Cisco SR520-ADSLI-K9, Cisco SR520W-ADSLI-K9

The Cisco Secure Router 520 Series routers are designed for small businesses with up to 50 users and teleworkers who want secure connectivity to corporate LANs and to the Internet. These routers provide advanced security features that include secure Virtual Private Network (VPN) access and comprehensive threat defense with Cisco IOS Firewall, Intrusion Prevention Solution (IPS), and URL filtering. The Cisco Secure Router 520 Series routers also provide dynamic routing and advanced quality of service (QoS) features. They are available in two Ethernet models and four DSL models.

Ethernet Models:

- Cisco Secure Router 520 Ethernet-to-Ethernet (without wireless functionality).
- Cisco Secure Router 520 Ethernet-to-Ethernet Wireless (with wireless functionality).

DSL Models:

- Cisco Secure Router 520 ADSL-over-POTS (without wireless functionality).
- Cisco Secure Router 520 ADSL-over-POTS Wireless (with wireless functionality).
- Cisco Secure Router 520 ADSL-over-ISDN (without wireless functionality).
- Cisco Secure Router 520 ADSL-over-ISDN Wireless (with wireless functionality).

Enhanced IP Communications Foreign Exchange Station and E&M Voice Interface Card

New voice interface cards (VICs) are supported on Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851, Cisco 3825, and Cisco 3845 Integrated Services Routers. For detailed information about these cards, see the following:

Connecting Cisco 2-Port FXS/DID Voice Interface Cards

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/2port_FXS_DID_VIC.html

Connecting Cisco 2-Port FXS-E/DID Voice Interface Cards

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/2port_FXS_E_DID_VIC.html

Connecting Cisco 4-Port FXS/DID Voice Interface Cards

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/4port_FXS_DID_VIC.html

Connecting Cisco 2-Port E&M Voice Interface Cards

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/2port_EM_VIC.html

HWIC-1B-U

HWIC-1B-U is a BRI U interface module that provides a single basic rate ISDN U WAN interface. The HWIC-1B-U is a replacement interface card for the WIC-1B-U-V2 WAN Module. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/ISDN_BRI_U_hwic.html

HWIC-1CE1T1-PRI, HWIC-2CE1T1-PRI, HWIC-4T1/E1, NM-8CE1T1-PRI

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4/12_4x/12_4_11xw/fmt1e1ic.html

HWIC-4B-S/T

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/ISDN_BRI_ST_hwic.html

Network Capacity Expansion

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/ps9702/index.html

Sync/Async/T1DSU HWICS (HWIC-1T, HWIC-2T, HWIC-2A/S, HWIC-1DSU)

For detailed information about this feature, see the following documents:

Connecting Cisco Serial High-Speed WAN Interface Cards at http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/1_2T_2AS_HWIC.html.

Connecting Cisco DSU/CSU High-Speed WAN Interface Cards at http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/DSU_T1_HWIC.html.

UC520

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/ps7293/index.html

New Software Features Supported in Cisco IOS Release 12.4(20)T

This section describes new and changed features in Cisco IOS Release 12.4(20)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(20)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

6PE Multipath

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mptcl_bgp.html

Ability to Generate a Busy After Remote End On-Hook

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html

Address CNEM Gap Analysis for ARTG Platforms Phase 2D

The Consistent Network Element Manageability (CNEM) feature defines a network management standard for the Cisco product line of network elements. Beginning with Cisco IOS Release 12.4(20)T, CNEM v2.0 provides CNEM v2.0 compliance on Access Routing Technology Group (ARTG) platforms. For more information about CNEM v2.0 compliance for the CNEM v2.0 requirements and the platforms supported, or to locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

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

AMR-NB Codec Support for MGCP

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/it_amrnb.html

Application Inspection and Control for SMTP

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_app_insp_ctrl_smtp.html

BGP Multicast Inter-AS (IAS) VPN

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_cfg_mc_vpn_sup.html

BGP Support for TCP Path MTU Discovery per Session

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/iproute/configuration/guide/irp_bgp_neighor.html

Call Detail Records (CDR) Comma Separated Value Format with FTP and Flash Storage

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cdr/developer/guide/cdrcsv.html

Caller ID on FXO for MGCP

The Caller ID on FXO for MGCP feature provides caller ID on FXO for MGCP calls. However, this feature works with and is dependent on the Cisco Unified Communications Manager application and is not supported in Cisco Unified Communications Manager Release 7.0 or earlier. To determine if this feature is supported in your environment, see dependencies and other information in the *Cisco Voice Gateway Router Interoperability with Cisco Unified Communications Manager* data sheet (previously called Cisco Unified CallManager) located at http://www.cisco.com/en/US/products/hw/modules/ps3115/products_data_sheets_list.html.

For more information about configuring caller ID, see the various **caller-id** commands included in the *Cisco IOS Voice Command Reference* at http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html and the *Cisco Unified Communications Manager Express Command Reference* at http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/command/reference/cme_cr.html.

CFM-2

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_metro_ethernet.html

Cisco Express Forwarding—SNMP CEF-MIB Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipswitch/configuration/guide/cef_snmp_mib.html

Cisco Integrated 3G-324M Gateway

For detailed information about this feature, see the following:

http://cisco.com/en/US/products/ps9671/prod_module_series_home.html

Cisco IOS Content Filtering

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_url_filtering.html

Cisco IOS Firewall—SIP Enhancements: ALG and AIC

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_sip_alg_aic.html

Cisco IOS-FW—H.323 v3/v4 Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_fwall_h323_supp.html

Cisco IOS-FW—Support for Skinny Local Traffic and CME

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_fwall_skinny_local.html

Cisco Unified Communications Manager Express 4.2: Media Encryption (SRTP)

For detailed information about this feature, see the following:

http://cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmeauth.html

CISCO-DATA-COLLECTION-MIB

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_mib_collect_trans.html

CISCO-IP-URPF-MIB Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_urpf_mib.html

CISL—SNMP Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_commands.html

CLI for Displaying Certificates in Cisco IOS (Manageability Enhancement)

The CLI for Displaying Certificates in Cisco IOS (Manageability Enhancement) feature provides the user functionality for displaying all certificates in the Cisco IOS certificate server database, for trimming expired certifications from a certificate revocation list (CRL), and for recovering a revoked certificate. The following commands were introduced or modified by this feature:

- **crypto pki server trim**
- **crypto pki server trim generate expired-list**
- **crypto pki server unrevoke**
- **show crypto pki server certificates**
- **show crypto pki server crl**
- **show crypto pki server requests**

For detailed information about the commands that are introduced or modified by the CLI for Displaying Certificates in Cisco IOS (Manageability Enhancement) feature, see the *Cisco IOS Security Command Reference*:

http://www.cisco.com/en/US/docs/ios/security/command/reference/sec_book.html

CNEM 2.0 Phase 2A Baseline Compliance

The Consistent Network Element Manageability (CNEM) feature defines a network management standard for the Cisco product line of network elements. Beginning with Cisco IOS Release 12.4(20)T, CNEM v2.0 provides compliance for the following MIBs:

- CISCO-ENTITY-FRU-ENTITY-MIB
- CISCO-IMA-MIB
- CISCO-ENTITY-EXT-MIB
- CISCO-ENTITY-FRU-CONTROL-CAPABILITY-MIB

For more information about these MIBs, or to locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

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

CNEM 2.0 Phase 2B and 2C Baseline Compliance

The Consistent Network Element Manageability (CNEM) feature defines a network management standard for the Cisco product line of network elements. Beginning with Cisco IOS Release 12.4(20)T, CNEM v2.0 provides CNEM v2.0 compliance on Access Business Unit (ABU) and Access Routing Technology Group (ARTG) platforms. For more information about CNEM v2.0 compliance for the CNEM v2.0 requirements and the platforms supported, or to locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

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

Commands for SNMP Diagnostics

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cfg_snmp_sup.html

Communications Manager Express 7.0

Cisco IOS Release 12.4(20)T includes the same features as in Cisco Unified Communications Manager Express 4.3, which is renumbered to 7.0 to align with Cisco Unified Communications versions. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmeadm.html

Communications Manager Express Extension Mobility Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmemobl.html

Configuration Change Tracking Identifier

The Configuration Change Tracking Identifier feature assigns a version number to each saved version of the Cisco IOS running-config file, and displays output about the versions. When the version number is updated, a notification of the change in version number is generated. The Configuration Logger can also use this feature to determine if there have been any changes to the Cisco IOS running-config file. To enable the Configuration Change Tracking Identifier feature, enter the **show config id** command. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_s1.html#wp1083860

Configurable Bandwidth Parameters for SIP Calls

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html#wp1362341

Configurable SIP Listening Port

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html#wp1344896

Configurable SIP Parameter Modification

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html#wpxref95336

Configuration Rollback Confirmed Change

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-rollback.html

Control Media Cut-Through on SIP 18*x* Response

The Control Media Cut-Through on SIP 18*x* Response feature provides the ability to restrict media cut-through to the backward direction only (from the called party to the calling party) when a 18*x* response with SDP is received. However, this feature must be enabled manually because the default behavior on a Cisco IOS SIP gateway is to do bidirectional cut-through upon receipt of a 18*x* with SDP response.

For more information about backward media-cut through, see the **rtp send-recv** command in the *Cisco IOS Voice Command Reference* at http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html.

CTCP Support on Easy VPN Clients

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_easy_vpn_rem.html

Detecting Presence of Analog Phones

The Detecting Presence of Analog Phones feature introduces the **test voice port phone-detection** command to determine if an analog phone is connected to a Cisco IAD2430 Series Integrated Access Device (IAD) or Cisco VG224 Analog Phone Gateway (VG224). For detailed information about this command, see the following:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_t1.html#wp1666730

Digital Modem Support and Modem Resource Pooling

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/htpvdm2.html

Disable Outbound SIP Proxy on a Per Dial-Peer Basis

The Disable Outbound SIP Proxy on a per Dial-Peer Basis feature provides the ability to disable outbound proxy for a given dial peer or for Session Initiation Protocol (SIP) line-side phones on Cisco Unified CME when outbound proxy is configured on a SIP trunk. For more information about configuring an outbound proxy for SIP, refer to the “Configuring SIP Message, Timer, and Response

Features” module at
http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/sip_cg-msg_tmr_rspns.html#Outbound_Proxy_Support_for_the_SIP_Gateway.

Dynamic Frequency Selection (DFS) and IEEE 802.11h Transmit Power Control

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/1800/wireless/configuration/guide/awg.html

E-911 Services for CME

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cusrst/admin/sccp_sip_srst/configuration/guide/SCCP_and_SIP_SRST_Admin_Guide.html

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cme911.html

Embedded Event Manager (EEM) 2.4

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_eem_overview.html

Embedded Menu Manager

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_emm.html

Embedded Packet Capture

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_troubleshooting.html

Enhanced ARQ and RRQ Security for Gatekeeper Registrations

For detailed information about this feature, see the following:

http://cisco.com/en/US/docs/ios/voice/cubegk/configuration/guide/ve-gk-config.html#wpxref68806

Event MIB and Expression MIB Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cfg_snmp_sup.html

FIB Data Consistency Checking

The Cisco Express Forwarding—FIB Data Consistency Checking feature is available in Cisco IOS Release 12.4(20)T and later releases. This feature adds Forwarding Information Base (FIB) data checking to the Cisco Express Forwarding consistency checker.

To enable FIB data checking for the IPv4 FIB, enter the **cef table consistency-check ipv4 data-checking** command.

To enable FIB data checking for the IPv6 FIB, enter the **cef table consistency-check ipv6 data-checking** command.

For more information, see the *Cisco IOS IP Switching Command Reference* at the following URL:

http://www.cisco.com/en/US/docs/ios/ipswitch/command/reference/isw_book.html

Flexible NetFlow—IPv6 Unicast Flows

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/12_4t/fnf_12_4t_book.html

Flexible NetFlow—Output Features on Data Export

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/12_4t/fnf_12_4t_book.html

Frame Relay QoS Features with Hierarchical Queueing Framework (HQF)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/qos_frhqf_support.html

FXO Delayed Caller ID Delivery

Before Cisco IOS Release 12.4(11)XW, Foreign Exchange Office (FXO) Caller ID in North America was delivered between the first and second ring cycles based on the Telcordia GR-30-CORE standard. FXO software was configured to wait for Caller ID delivery before initiating the call setup for the next leg. As a result, the destination endpoint did not start ringing until after 1.5 to 2 ring cycles on the FXO port.

Beginning with Cisco IOS Release 12.4(11)XW, the **immediate** keyword is added to the **connection plar opx** command. When this keyword is included in the syntax, the FXO port sets up calls immediately so that the ring-cycle discrepancy is eliminated, and the perception of the number of rings is the same for both the caller and the called party. When the Caller ID is available, it is forwarded to the called number. If the called party answers the call before the Caller ID has been forwarded, the Caller ID update will not be forwarded to the display at the called party. Refer to the *Cisco IOS Voice Command Reference*:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html

G.722-64K Support on CME; G.722 and iLBC Transcoding, Conferencing Support on CME

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4/12_4_mainline/jtg722atg_gold.html

G.729br8 Codec as a Superset of G.729r8 and G.729br8 Codecs

The G.729br8 Codec as a Superset of G.729r8 and G.729br8 Codecs feature enables a Cisco IOS Session Initiation Protocol (SIP) gateway to treat G.729br8 as a superset of G.729r8 (G.729 or G.729a) and G.729br8 (G.729b or G.729ab). When this feature is enabled, the Cisco IOS gateway presumes that the remote endpoint supports both G.729r8 and G.729br8 codecs and negotiates which codec to use based on the local configuration. Similarly, when the Cisco IOS SIP gateway sends a G.729br8 offer, it can accept either a G.729r8 or G.729br8 response from the remote endpoint. In both cases, the negotiated codec is downloaded to the DSP and used by both endpoints.

For more information about this feature, see the **g729-annexb-all** and **voice-class sip g729 annexb-all** commands in the *Cisco IOS Voice Command Reference* at http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html.

Gatekeeper Enhancement: Support for Extended InterZone Clear Token

For detailed information about this feature, see the following:

http://cisco.com/en/US/docs/ios/voice/cubegk/configuration/guide/ve-gk-config.html

H.320 Video—ISO/IEC-13871 Bonding

For detailed information about this feature, see the following:

http://cisco.com/en/US/products/ps9671/prod_module_series_home.html

H.323 Name Display

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-cm.html#wp1315365

HFC RIP Relay

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/iproute/configuration/guide/irp_rip_hfc.html

HTTP Cookie Support per RFC2965

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/bbdsl/configuration/guide/bba_tr069_agent.html

IM Blocking Support in IOS Firewall for ICQ & Windows Messenger

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_zone_polcy_firew.html

IP SLAs for Metro-Ethernet

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_metro_ethernet.html

IP SLAs Responder

Cisco IOS IP Service Level Agreements (SLAs) is a capability embedded in Cisco IOS software that allows Cisco customers to understand IP service levels, increase productivity, lower operational costs, and reduce the frequency of network outages. In Cisco IOS Release 12.4(7), support for the IP SLAs Responder in IP Base Cisco IOS Packaging was introduced on several Cisco platforms. The IP SLAs Responder provides the capability to easily obtain precision network response time measurements between Cisco IOS source and destination devices. In the IP Base feature set, the IP SLAs Responder supports the User Datagram Protocol (UDP) echo, UDP jitter, and TCP connect operations.

In Cisco IOS 12.4(20)T, support for the IP SLAs Responder in IP Base Cisco IOS Packaging is made available on a larger number of Cisco platforms. Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

IP SLAs VRF Aware 2.0

The IP SLAs VRF Aware 2.0 feature provides the capability to monitor IP service levels within Multiprotocol Label Switching (MPLS) Virtual Private Networks (VPNs). Using IP SLAs within MPLS VPNs allows service providers to plan, provision, and manage IP VPN services according to the service level agreement (SLA) for a customer. Use the **vrf** command to configure an IP SLAs operation for a specific VPN by entering a VPN routing and forwarding (VRF) name.

In Cisco IOS Release 12.2(2)T, support for VRF awareness was introduced for the following IP SLA operations:

- ICMP echo
- Path echo
- Path jitter
- UDP echo
- UDP jitter

In Cisco IOS Release 12.4(20)T, support for VRF awareness is made available for the following additional IP SLA operations:

- DNS

- FTP
- HTTP
- TCP Connect

For detailed information about IP SLA commands, see the *Cisco IOS IP SLAs Command Reference* at the following location:

http://www.cisco.com/en/US/docs/ios/ipsla/command/reference/sla_book.html

IPsec Usability Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ipsec_vpn_status_monitoring.html

IP-TUNNEL-MIB

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/interface/configuration/guide/ir_impl_tun_ps6350_TSD_Products_Configuration_Guide_Chapter.html

IPv6—CNS Agents

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—Config Logger

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—HTTP(S)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—IP SLAs (UDP Jitter, UDP Echo, ICMP Echo, TCP Connect)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—Netconf

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—SOAP

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6—TCL

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mng_apps.html

IPv6 ACL Extensions for IPsec Authentication Header

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-sec_trfltr_fw.html

IPv6 over DMVPN

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-dmvpn.html

IPv6 VPN over MPLS (6VPE)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-ov_mpls_6vpe.html

ISDN FACILITY and NOTIFY Mapping to SIP INFO

The ISDN FACILITY and NOTIFY Mapping to SIP INFO feature adds support for mapping ISDN FACILITY and ISDN NOTIFY messages to SIP INFO messages and vice versa. The Q.931 contents of ISDN FACILITY and ISDN NOTIFY messages are tunneled in SIP INFO messages when either the **signaling forward rawmsg** or the **signaling forward unconditional** command is enabled. Similarly, Q.931 raw messages received in SIP INFO messages are sent across to PSTN in an ISDN FACILITY or ISDN NOTIFY message.

For more information about mapping ISDN FACILITY and NOTIFY messages to SIP INFO messages, see the “Transparent Tunneling of QSIG and Q.931 over SIP TDM Gateway and SIP-SIP CUBE” module at http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/tunneling_qsig.html.

ISDN Q.931 Tunneling over SIP TDM Gateway

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/tunneling_qsig.html

Land Mobile Radio (LMR) over IP Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_3t/12_3t7/feature/guide/gtlmrip.html

License Call Home

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_callhome.html

Licensing Storage

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_expand.html

Malicious Call Identification on the VG224s and Cisco Voice Gateways with Cisco Unified Communications Manager

The Malicious Call Identification (MCID) supplementary service allows you to report a call of a malicious nature by requesting that Cisco Unified Communications Manager identify and register the source of an incoming call in the network. The MCID feature code is system defined and fixed. It cannot be modified by user and does not use any prefix. To enable the MCID feature, use the **stcapp feature access-code** command. To disable the feature, use the **no stcapp feature access-code** command.

The **show feature access-code** command output was expanded to include malicious call ID (MCID).

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_s08.html#wp1380053

Media and Signaling Encryption (SRTP/TLS) on DSP Conferencing Farm

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/itsdsp.html

Mobile IP—Mobile Networks v6—Basic NEMO

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-mobile.html

MPLS—Multilink PPP Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_mppp_support.html

MPLS EM—MPLS FRR MIB (IETF Draft v01)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_fast_rr_mib.html

MPLS EM—MPLS Multipath (ECMP) LSP Tree Trace

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_em_multipath_tree.html

MPLS Infrastructure Changes: Introduction of MFI and Removal of MPLS LSC and LC-ATM Features

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_lsc_removed.html

MPLS LDP—Lossless MD5 Session Authentication

The MPLS LDP—Lossless MD5 Session Authentication feature enables a Label Distribution Protocol (LDP) session to be password-protected without tearing down and reestablishing the LDP session. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_ldp_lossless_md5.html

MPLS LDP—MD5 Global Configuration

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_ldp_md5_global.html

MPLS TE—Fast Reroute over ATM

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_frr_node_prot.html

MPLS TE—Fast Tunnel Interface Down Detection

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_link_node_prot.html

MPLS TE—Node Protection Desired Bit

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_link_node_prot.html

MPLS Traffic Engineering—AutoTunnel Mesh Groups

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_autotun_mesh.html

MPLS Traffic Engineering—Policy Routing onto MPLS TE Tunnels

Cisco IOS Release 12.4(20)T supports mapping packets to MPLS Traffic Engineering tunnels.

For more information, see the **set interface** command in the *Cisco IOS IP Routing Protocols Command Reference* at the following URL:

http://www.cisco.com/en/US/docs/ios/iproute/command/reference/irp_pi2.html

MPLS Traffic Engineering (TE)—AutoTunnel Primary and Backup

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_autotunnel.html

MPLS Traffic Engineering (TE)—Class-based Tunnel Selection

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_tun_select.html

MPLS Traffic Engineering (TE)—Configurable Path Calculation Metric for Tunnels

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_cfg_path_calc.html

MPLS Traffic Engineering (TE)—Fast Reroute (FRR) Link and Node Protection

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_frr_node_prot.html

MPLS Traffic Engineering (TE)—Interarea Tunnels

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_interarea_tun.html

MPLS Traffic Engineering (TE)—LSP Attributes

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_lsp_attr.html

MPLS Traffic Engineering (TE)—Path Protection

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_path_prot.html

MPLS Traffic Engineering (TE)—RSVP Graceful Restart

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_rsvp_graceful.html

MPLS Traffic Engineering (TE)—RSVP Hello State Timer

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_rsvp_hello.html

MPLS Traffic Engineering (TE)—Scalability Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_scale_enhance.html

MPLS Traffic Engineering (TE)—Verbatim Path Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_verbatim_path.html

MPLS Traffic Engineering Forwarding Adjacency

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_fwd_adjacency.html

MPLS Traffic Engineering—Shared Risk Link Groups (SRLG)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_shared_risk.html

MPLS Traffic Engineering—Inter-AS TE

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_inter_as_te.html

MPLS VPN—Load-Balancing Support for Inter-AS and CSC VPNs

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_load_share_vpn.html

MPLS VPN—Multi-Path Support for Inter-AS VPNs

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_load_share_vpn.html

MPLS VPN—Route Target Rewrite

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_rte_target_rw.html

MPLS VPN—Show Running VRF

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_show_run_vrf.html

MPLS VPN—VPN Aware LDP MIB

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_mib_supp.html

MPLS VPN—VRF CLI for IPv4 & IPv6 VPNs

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_ipv4_ipv6.html

MPLS VPN Half Duplex VRF (HDVRF)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_half_dup_vrf.html

Multicast VPN Inter-AS Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_cfg_mc_vpn_sup.html

NetFlow: Removal of IPv6 NetFlow

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-netflow.html

NHRP MIB for DMVPN Networks

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_dmvpn_nhrp_mib.html

NTPv4

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-ntpv4_ps6441_TSD_Products_Configuration_Guide_Chapter.html

Object Groups for ACLs

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_object_group_acl.html

Pass Data in SIP REFER to Triggered INVITE

The Pass Data in SIP REFER to Triggered INVITE feature allows a user to send any information from transferrer to transfer-target using the Call-Info value as the URL parameter in the REFER-TO header of a SIP REFER message. With this feature, the user can populate the Call-Info header with any customer-specific data and the data is copied into the REFER-TO header of the triggered INVITE message when the call to the transfer target is established.

Performance Routing with NBAR/CCE Application Recognition

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/oer/configuration/guide/pfr-profile.html

Per-VRF Assignment of BGP Router-ID

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/iproute/configuration/guide/bgp_router_id.html

PKI—CLI to Control Certificate Revocation List (CRL) Cache

The PKI—CLI to Control Certificate Revocation List (CRL) Cache feature allows the administrator to control the CRL cache size. CRLs are received by Cisco IOS software in Distinguished Encoding Rules (DER) encoded format. Because processing a DER encoded CRL uses CPU time, Cisco IOS software allows CRLs either to be stored in cache after being processed or to be decoded for the first time. Configuring the CRL cache size allows the amount of memory used for the CRL cache to be reduced (for instance, if low memory conditions exist) or to be increased for better performance (for instance, when a large number of CRLs are being processed).

The following commands were introduced or modified by this feature: **crypto pki crl cache** and **show crypto pki crls**. The **crypto pki crl cache** command allows the administrator to set the maximum amount of volatile memory used to cache CRLs. When the **crypto pki crl cache** command is configured, the **show crypto pki crls** command output includes information on the CRL cache size.

For detailed information about the commands that are introduced or modified by the PKI—CLI to Control Certificate Revocation List (CRL) Cache feature, see the *Cisco IOS Security Command Reference*:

http://www.cisco.com/en/US/docs/ios/security/command/reference/sec_book.html

PPPoEoA over ATM AAL5Mux

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/bbdsl/configuration/guide/bba_pppoeoa_aal5mux.html

QoS—Hierarchical Queueing Framework (HQF)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/qos_frhqf_support.html

RSVP—Previous Hop Overwrite

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/qos_rsvp_phop_ovrite.html

RSVP Agent

The RSVP Agent feature is now supported on the following router platforms using the Cisco IOS Advanced IP Services Image or higher:

- Cisco 7200 series router (with NPE-G1 or NPE-G2)
- Cisco 7201 series router
- Cisco 7301 series router

For more information about RSVP Agent, see the "RSVP Agent" section of the *Cisco CallManager and Cisco IOS Interoperability Guide* at the following URL:

http://www.cisco.com/en/US/docs/ios/voice/cminterop/configuration/guide/vc_rsvp_agent.html

Secure Device Provisioning (SDP) Connect Template

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_setup_SDP_piki.html

Session Border Controller Enhancements for H.323-SIP and SIP-SIP Supplementary Services, Transcoding Optimization and Firewall Integration

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps5640/products_installation_and_configuration_guides_list.html

SIP—Support for SESSION REFRESH with reINVITEs

For detailed information about this feature, see the following:

http://cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html

SIP Delayed Offer to Early Offer for Video Calls

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-sipsip.html#wp1355599

SIP SRTP Fallback to Nonsecure RTP

The SIP SRTP Fallback to Nonsecure RTP feature enables a Cisco IOS SIP gateway to fall back from SRTP to RTP by accepting or sending an RTP/AVP(RTP) profile in response to an RTP/SAVP(SRTP) profile. This feature also allows inbound and outbound SRTP calls with nonsecure SIP signaling schemes (such as SIP URL) and provides the administrator the flexibility to configure TLS, IPsec, or any other security mechanism used in the lower layers for secure signaling of crypto attributes.

For more information about configuring SRTP fallback and negotiation, see the **srtp**, **srtp negotiate**, and **voice-class sip srtp negotiate** commands in the *Cisco IOS Voice Command Reference* at http://www.cisco.com/en/US/docs/ios/voice/command/reference/vr_book.html.

SRST: Survivable Remote Site Telephony 7.0

Cisco IOS Release 12.4(20)T includes the same features as in Cisco Unified Survivable Remote Site Telephony 4.3, which is renumbered to 7.0 to align with Cisco Unified Communications versions. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmeadm.html

SSHv2 Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_secure_shell_v2.html

SSL VPN—Access Control Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

SSL VPN—AnyConnect Client Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

SSL VPN—Back End HTTP Proxy

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

SSL VPN—Full-Tunnel CEF Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

SSL VPN—Stateless High Availability with HSRP

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

SSL VPN—URL Rewrite Splitter

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_ssl_vpn.html

Support for Lawful Intercept via the SII Architecture

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb-gw-overview.html#wp1147476

SW 128ms ECAN

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/vfc_dsp.html

System Accounting Record Generation for Server Addition/Deletion Made VRF Aware

System accounting records are generated whenever a RADIUS server is added or deleted in a VRF when using the **server-private** CLI command. For details about this new feature, see the accounting (server-group) command page.

Throttling of AAA (RADIUS) Records

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_throtl_aaa.html

TR-069—Support for Ethernet LAN Profile, Time Profile, ATM Loopback Profile and TraceRoute Profile

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/bbdsl/configuration/guide/bba_tr069_agent.html

TR-069 Agent

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/bbdsl/configuration/guide/bba_tr069_agent.html

Transparent Tunneling of QSIG and Q.931 over SIP-SIP Cisco Unified Border Element (CUBE)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/tunneling_qsig.html

Transparent Tunneling of QSIG over SIP TDM Gateway

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/tunneling_qsig.html

Unified Communications Manager Express 4.2

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/admin/configuration/guide/cmeadm.html

Universal Voice Transcoding Support for the IP-to-IP GW

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/voice/cube/configuration/guide/vb_book/vb_book.html

User Based Firewall Support

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_user_fw_supp.html

Voice Quality Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/vqmetric.html

VPDN Group Selection Based on VRF and Dest IP

The VPDN Group Selection feature allows you to configure multiple customized VPDN tunnels with different Virtual Private Dialup Network (VPDN) group configurations between an L2TP Access Concentrator (LAC) and an L2TP Network Server (LNS). For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/vpdn/configuration/guide/additional_vpdn_feat.html

VRF Aware Cisco IOS IPS

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_vrf_aware_ips.html

WCCP L2 Return

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipapp/configuration/guide/ipapp_wccp.html

WCCP Layer 2 Redirection/Forwarding

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipapp/configuration/guide/ipapp_wccp.html

WCCP Mask Assignment

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipapp/configuration/guide/ipapp_wccp.html

XML-PI

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_xmlpi_v1.html

New Software Features Supported in Cisco IOS Release 12.4(15)T9

This section describes new and changed features in Cisco IOS Release 12.4(15)T9. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T9. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

AIS Support on Channelized CEM

For detailed information about this feature, see the *Configuring AIS on Channelized T1E1-CEM* document at the following URL:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/ais_t1e1.html

New Hardware Features Supported in Cisco IOS Release 12.4(15)T7

This section describes new and changed features in Cisco IOS Release 12.4(15)T7. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T7. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

Sync/Async/T1DSU HWICS (HWIC-1T, HWIC-2T, HWIC-2A/S, HWIC-1DSU)

For detailed information about this feature, see the following documents:

Connecting Cisco Serial High-Speed WAN Interface Cards at http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/1_2T_2AS_HWIC.html.

Connecting Cisco DSU/CSU High-Speed WAN Interface Cards at http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/DSU_T1_HWIC.html.

New Software Features Supported in Cisco IOS Release 12.4(15)T5

This section describes new and changed features in Cisco IOS Release 12.4(15)T5. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T5. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

Cisco Group Encrypted Transport VPN

The Cisco Group Encrypted Transport feature is now supported on VSA. For detailed information about this feature, see the following URL:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_encrypt_trns_vpn.html

RSVP Agent on Cisco 7200 Series Routers

The RSVP Agent feature is now supported on the following router platforms using the Cisco IOS Advanced IP Services Image or higher:

- Cisco 7200 series router (with NPE-G1 or NPE-G2)
- Cisco 7201 series router
- Cisco 7301 series router

For more information about RSVP Agent, see the “RSVP Agent” section of the Cisco CallManager and Cisco IOS Interoperability Guide at the following URL:
http://www.cisco.com/en/US/docs/ios/voice/cminterop/configuration/guide/vc_rsvp_agent_ps6350_TSD_Products_Configuration_Guide_Chapter.html

New Software Features Supported in Cisco IOS Release 12.4(15)T4

This section describes new and changed features in Cisco IOS Release 12.4(15)T4. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T4. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

Cisco NM-1A-OC3-POM Network Module

This network module has been enhanced by extending the support of the **queue-depth** command to include PVC bundles. For more information about this enhancement, see the following URL:

http://www.cisco.com/en/US/docs/ios/12_4/12_4_mainline/atm_oc3.html

New Software Features Supported in Cisco IOS Release 12.4(15)T2

This section describes new and changed features in Cisco IOS Release 12.4(15)T2. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T2. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Ethernet Connectivity Fault Management
- Ethernet Local Management Interface
- Ethernet Operations, Administration, and Maintenance
- GPRS: Gateway Support Node (GGSN) R6.0
- IEEE 802.3ah, Ethernet OAM
- QoS: Tunnel Marking for GRE Tunnels

Ethernet Connectivity Fault Management

The Ethernet Connectivity Fault Management feature is now supported on the Cisco 7200 VXR router. For information about this feature, go to http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_cfm.html.

Ethernet Local Management Interface

The Ethernet Local Management Interface feature is supported in Cisco IOS Release 12.4(15)T2. For information about this feature, go to http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_elmi.html.

Ethernet Operations, Administration, and Maintenance

The Ethernet Operations, Administration, and Maintenance feature is now supported on the Cisco 7200 VXR router. For information about this feature, go to http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_oam.html.

GPRS: Gateway Support Node (GGSN) R6.0

The GPRS: Gateway Support Node (GGSN) R6.0 feature is now supported in Cisco IOS Release 12.4(15)T2. For information about this feature, go to http://www.cisco.com/en/US/docs/ios/12_4/12_4x/12_42xb/ggsn6_0/cfg/ggsn60_c.html.

IEEE 802.3ah, Ethernet OAM

For detailed information about the IEEE 802.3ah, Ethernet OAM feature, see the following:

http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_oam.html

QoS: Tunnel Marking for GRE Tunnels

For detailed information about the QoS: Tunnel Marking for GRE Tunnels feature, see the following:

http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/tnl_mrkg_gre_tnls.html

New Hardware Features Supported in Cisco IOS Release 12.4(15)T1

This section describes new and changed features in Cisco IOS Release 12.4(15)T1. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T1. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- Cisco 7201 Router
- Port Adapter Enhancements - 2 New Clear Channel Port Adapters and Channelized PA hardware acceleration of MLPPP/MLFR/LFI/FRF12

Cisco 7201 Router

The Cisco 7201 router provides application-specific features for broadband subscriber aggregation and network application services with high processing performance. The Cisco 7201 is a compact 1-rack-unit router that offers:

- four built-in Gigabit Ethernet ports
- pluggable Gigabit Ethernet optics (small form-factor pluggable [SFP] optics) one dedicated 10/100-Mbps copper Ethernet Management port
- one USB port for general storage and security token storage
- one port adapter slot
- one CompactFlash Disk slot
- 1 GB SDRAM DIMM (upgradable to 2 GB)
- console and auxiliary ports

The Cisco 7201 router supports IPSec VPN solutions (including DMVPN, EasyVPN, GETVPN, etc.) with the SA-VAM2+ starting with Cisco IOS Release 12.4(15)T advanced security or higher image. Any prior release does not provide crypto support for the Cisco 7201 series routers.

Port Adapter Enhancements - 2 New Clear Channel Port Adapters and Channelized PA hardware acceleration of MLPPP/MLFR/LFI/FRF12

See the *PA-MC-T3-EC Port Adapter Installation and Configuration* document at http://www.cisco.com/en/US/docs/interfaces_modules/port_adapters/install_upgrade/multichannel_serial/pa-mc-t3-ec_install_config/10589ov.html.

New Software Features Supported in Cisco IOS Release 12.4(15)T1

This section describes new and changed features in Cisco IOS Release 12.4(15)T1. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T1. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Access Point Link Role Flexibility
- Automatic Signature Extraction
- Call Admission Control (CAC) Bandwidth Based for IP Multicast
- Cisco IOS IPS Support for Microsoft Engines
- Cisco IOS SHA2 Support
- Closed RP Interface Support on Packet Data Serving Node
- Consent Feature for Cisco IOS Routers
- DHCP Server Multiple Subnet
- DHCPv6 Client Information Refresh Option
- DHCPv6 Server SNTP, NIS, NIS+, Refresh Timer Options
- DHCPv6 Server Stateless Auto Configuration
- Digital Optical Monitoring
- Disk File System Enhancements - ATA Enhancements and FAT32 Support
- EIGRP Dynamic Metric Calculations
- Embedded Resource Manager (ERM) - MIB
- FHRP - GLBP Client Cache
- Field-Programmable Device Upgrades
- FPM Full Packet Filtering
- HTTP TACAC+ Accounting Support
- HTTP(S) USB Flash
- IP Local Pools Holdback Timer
- ISDN Setup: Hash Character Within Called Party Information Element
- L2TP Congestion Avoidance
- L2TP Forwarding of PPPoE Tag Information

- Logging to Local Nonvolatile Storage (ATA Disk)
- Mobile IP Route Propagation Within VRF on Home Agent
- NAC - L2 IEEE 802.1x
- OSPF Mechanism to Exclude Connected IP Prefixes from LSA Advertisements
- OSPFv2 Local RIB
- OSPFv3 Dynamic Interface Cost Support
- Performance Routing—Application Interface
- Performance Routing—Link Groups
- Port Adapter Enhancements—2 New Clear Channel Port Adapters and Channelized PA hardware Acceleration of MLPPP/MLFR/LFI/FRF12
- Reserve Memory for Console Access
- RRI Enhancements
- SCTP Release 4
- Signed Tcl Scripts
- SSL VPN Front-Door VRF Support
- SSL VPN GUI Enhancements
- SSL VPN User-Level Bookmarking
- USB Token and Secure Device Provisioning (SDP) Integration
- Warm Reload
- X.25 Call Record

Application Aware Performance Routing: Static Application Mapping

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t_106/t_oersam.htm

Automatic Signature Extraction

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/htautosg.htm

Call Admission Control (CAC) Bandwidth Based for IP Multicast

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_admission_control.html

Cisco IOS IPS Support for Microsoft Engines

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/ips_4ms.htm

Cisco IOS SHA2 Support

The Cisco IOS SHA2 Support feature allows you to specify a cryptographic hash function for Cisco IOS certificate servers and clients. The cryptographic hash functions that can be specified are Message-Digest Algorithm 5 (MD5), Secure Hash Algorithm (SHA-1), SHA-256, SHA-384, or SHA-512. The following commands were introduced by this feature: **hash (ca-trustpoint)** and **hash (cs-server)**.

- The **hash (ca-trustpoint)** command sets the hash function for the signature that the Cisco IOS client will use to sign its self-signed certificates.
- The **hash (cs-server)** command sets the hash function for the signature that the Cisco IOS certificate authority (CA) will use to sign all of the certificates issued by the server.

Closed RP Interface Support on Packet Data Serving Node

Cisco PDSN Release 3.0 introduces the Closed-RP and Open-RP Integration feature, which includes the following details:

- Open RP and Closed RP handoff support on the same PDSN instance
- Open RP and Closed RP common clustering solution based on controller member architecture that already exist for Open RP

Consent Feature for Cisco IOS Routers

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/auth_fw.htm

DHCP Server Multiple Subnet

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sr/newft/122srb33/srbmultd.htm

DHCPv6 Client Information Refresh Option

The DHCPv6 information refresh option can specify an upper boundary for the length of time a client should wait before refreshing information retrieved from DHCPv6.

The following document provides information about this feature:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-dhcp.html

DHCPv6 Server SNTP, NIS, NIS+, Refresh Timer Options

The DHCPv6 server options are part of DHCP stateless autoconfiguration. The following document provides information about this feature:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-dhcp.html

DHCPv6 Server Stateless Auto Configuration

Hierarchical DHCPv6 for stateless configuration parameters allows a stateless or stateful DHCPv6 client to export configuration parameters (DHCPv6 options) to a local DHCPv6 server pool.

The following document provides information about this feature:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-dhcp.html

Digital Optical Monitoring

The Digital Optical Monitoring (DOM) feature allows you to display transceiver operating conditions, such as temperature and power levels, while the transceiver is in service. Use the show interfaces transceiver command to display operating conditions.

Disk File System Enhancements - ATA Enhancements and FAT32 Support

The Disk File System Enhancements - ATA Enhancements and FAT32 Support feature adds support in Cisco IOS software-based devices for flash cards that have been formatted with partitions on external devices. This feature also provides support for larger disk sizes through FAT32 support and support for disk partitions. In most scenarios, no user configuration is required to take advantage of this feature.

Additional file system information is now available through existing command-line interface (CLI) commands. See the documentation of the **format** command for additional information about reformatting flash-based devices. Additional file system enhancements that are introduced with this feature improve the performance and reliability of the system as a whole. The disk file system enhancements implemented as part of this feature include shared data structures, control structures, and other file system functions that apply to flash disks in various formats, such NVRAM, ATA flash disks, linear flash, USB Flash, and the system RAM.

EIGRP Dynamic Metric Calculations

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/timo_c/ip_manet.htm

Embedded Resource Manager (ERM) - MIB

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124cg/hnm_c/ch05/nm_erm.htm

FHRP - GLBP Client Cache

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/tglbpcca.htm

Field-Programmable Device Upgrades

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xd4/fpd.htm

FPM Full Packet Filtering

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_fpm.htm

HTTP TACAC+ Accounting Support

The HTTP TACAC+ Accounting Support feature introduces the **ip http accounting commands** command. This command is used to specify a particular command accounting method for HTTP server users. Command accounting provides information about the commands for a specified privilege level that are being executed on a device. Each command accounting record corresponds to one IOS command executed at its respective privilege level, as well as the date and time the command was executed, and the user who executed it.

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124cg/hnm_c/ch25/hhttp1s.htm

HTTP(S) USB Flash

The HTTP USB Flash Support feature introduces USB Flash media support for HTTP and HTTP over Secure Socket Layer (SSL), or HTTPS, IFS Servers. This feature allows USB Flash media to be uploaded to, and immediately served by, an HTTP and HTTPS IFS server.

IP Local Pools Holdback Timer

The IP Local Pools Holdback Timer configures a delay in the recycle of free IP addresses from the local pool. You can configure a unique IP address list for each pool.

http://www.cisco.com/en/US/docs/ios/12_3/sip/configuration/guide/ip_local.html

ISDN Setup: Hash Character Within Called Party Information Element

Before Cisco IOS Release 12.4(15)T, for overlap receiving, the "sending complete" indication was obtained through the Sending Complete IE. A hash mark (#) character received in the Called Party Number IE of an Information message was notified to the application without any special consideration and simply passed "as is" for number matching.

Starting with Cisco IOS Release 12.4(15)T, the hash mark (#) within the Called Party Number IE can also be used as an indication of "sending complete" and digit collection is stopped. As a result, the hash mark is treated as a terminating character for the Called Number. Receiving this hash mark character is equivalent to receiving a Sending Complete IE.

This feature is enabled by using the following command:

isdn overlap-receiving terminating-char #

L2TP Congestion Avoidance

The L2TP Congestion Avoidance feature provides packet flow control and congestion avoidance by throttling Layer 2 Transport Protocol (L2TP) control messages, as described in RFC 2661. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_2sb/feature/guide/sbl2scca.html

L2TP Forwarding of PPPoE Tag Information

The L2TP Forwarding of PPPoE Tag Information feature allows you to identify and uniquely map subscribers to Point-to-Point Protocol over Ethernet (PPoE) sessions through the subscriber's remote ID. This feature passes subscriber information collected on the Digital Subscriber Line Access Multiplexer (DSLAM) through to the Line Network Server (LNS) using a Layer 2 Tunneling protocol (L2TP) attribute-value (AV) pair. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/l2tgstub.html

Logging to Local Nonvolatile Storage (ATA Disk)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sb/newft/122sb28/cs_sysls.htm

Mobile IP Route Propagation Within VRF on Home Agent

The Home Agent supports overlapping IP addresses for mobile nodes for the mobile IP flows that are opened for different realms. This feature is based on the Multi-VPN Routing and Forwarding (VRF) CE network architecture and expands the BGP/MPLS VPN architecture to support multiple VPNs per Customer Edge (CE) device.

In the Cisco Home Agent Release 3.0, the VRF feature is enhanced to configure the network access identifier (NAI) to VRF mapping on the RADIUS server.

NAC_MIB

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_8/gt_nac.htm#wp1057291

OSPF Mechanism to Exclude Connected IP Prefixes from LSA Advertisements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/ht_osmch.htm

OSPFv2 Local RIB

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/ht_osrib.htm

OSPFv3 Dynamic Interface Cost Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/timo_c/ip_manet.htm

Performance Routing—Application Interface

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/toerapi.htm

Performance Routing—Link Groups

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/toerlink.htm

Port Adapter Enhancements—2 New Clear Channel Port Adapters and Channelized PA hardware Acceleration of MLPPP/MLFR/LFI/FRF12

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/prod/collateral/modules/ps2033/prod_white_paper0900aecd8056d3cb.html

Reserve Memory for Console Access

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s22/ftresmem.htm

RRI Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_14/gt_rrie.htm

SCTP Release 4

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/htsctp.htm

Signed Tcl Scripts

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/sign_tcl.htm

SSL VPN Front-Door VRF Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_sslug.htm

SSL VPN GUI Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_sslug.htm

SSL VPN User-Level Bookmarking

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_sslug.htm

USB Token and Secure Device Provisioning (SDP) Integration

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_setup_SDP_piki.pdf

Warm Reload

The Warm Reload feature is supported on the Cisco 7200 VXR router with the NPE-G2 network processing engine. The Warm Reload feature allows users to reload their routers without reading images from storage. That is, the Cisco IOS image reboots without ROM monitor mode (ROMMON) intervention by restoring the read-write data from a previously saved copy in the RAM and by starting

execution without either copying the image from flash to RAM or self-decompression of the image. Thus, the overall availability of the system improves because the time to reboot the router is significantly reduced.

X.25 Call Record

The X.25 Call Record feature makes it possible to generate a record on the source, destination, and intermediate routers for each X.25 call made through those routers. The Record also logs that Call Record onto a specified remote syslog server. This feature is disabled by default. The Record will be generated for each call that is set up and terminated successfully, each call that is set up successfully but terminates abnormally without exchange of X.25 Clear packets, and each call that fails to set up.

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/calrecrd.htm

New Hardware Features Supported in Cisco IOS Release 12.4(15)T

This section describes new and changed features in Cisco IOS Release 12.4(15)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(15)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- 3G HWIC
- ADSL2/2+ Annex M support on CISCO 877-M, CISCO 1801-M, and HWIC-1ADSL-M
- Cisco IAD2801 Series Integrated Access Devices
- HWIC and VLAN Feature Enhancements
- HWIC-4SHDSL, HWIC-2SHDSL Support
- NM-1A-T3/E3
- NME-WAE-522

3G HWIC

The Third Generation (3G) Wireless High-Speed WAN interface card (HWIC) is a multiband, multiservice WAN card. The primary application of 3GHWIC is WAN connectivity as a backup datalink for critical data applications. The 3G wireless WAN HWIC can also function as the primary WAN connection.

The 3G wireless WAN HWIC provides broadband WAN connectivity using high speed cellular data technology and it supports the following GSM and CDMA technologies:

- High-speed Downlink Packet Access (HSDPA)
- Universal Mobile Telecommunications System (UMTS)
- Enhanced Data-Rates for GSM Evolution (EDGE)
- General Packet Radio Service (GPRS)

- Evolution-Data Optimized (EVDO)
- 1 times Radio Transmission Technology (1xRTT)
- Automatic best network selection
- Multiple external antenna options
- Static and dynamic IP addressing
- Modem-based support for mobile IP
- Cellular interface based on the async interface in Cisco IOS
- NAT support
- Security features like Firewall, IDS/IPS and IPSec VPN on the router
- WAN switchover using IOS backup interface feature

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/3ghwic.htm

ADSL2/2+ Annex M support on CISCO 877-M, CISCO 1801-M, and HWIC-1ADSL-M

The Asymmetric Digital Subscriber Line (ADSL) 2/2+ Annex M feature supports routed bridge encapsulation over VC bundles on specific platforms in Cisco IOS Release 12.4(11)XJ. ADSL 2/2+ Annex M supports an upstream data rate of up to 3 Mbps and a downstream data rate of up to 24 Mbps. The increase of the Annex M (upstream) data rate is achieved by using some of the tones that were previously used in the downstream data rate in Annex A. As a result, downstream data rates are decreased in Annex M.

The ADSL training log generation command, **dsl-enable-training-log**, has been enhanced to specify the time when to capture a log file. This command enables the training log to record firmware debug messages.

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xj11/annexm.htm

Cisco IAD2801 Series Integrated Access Devices

The Cisco IAD2801 family is the new integrated voice and data services platform for service providers offering Managed Services. The Cisco IAD2801 series:

- Offers platforms for providing interconnect solutions for accelerating the migration from time-division multiplexing (TDM) to voice over IP (VoIP).
- Comprises fixed configuration platforms with voice interface cards, WAN connectivity modules, embedded encryption acceleration, voice digital-signal- processor (DSP) slots on the motherboard, intrusion prevention system (IPS) and IPSec features while maintaining a 1-rack-unit (RU) form factor for space-saving service provider managed services deployments.
- Supports TDM and VoIP, with proven quality-of-service (QoS) tools, multiple call- control protocols (such as Session Initiation Protocol [SIP], MGCP, and H.323), and diverse VoIP codecs.
- Offers the choice of Basic Rate Interfaces (BRI) voice ports over ADSL or G.SHDSL.

HWIC and VLAN Feature Enhancements

The Cisco Fast Ethernet High-Speed WAN Interface Cards (HWICs) are single-wide interface cards, available as a 1-port HWIC (HWIC-1FE) and as a 2-port HWIC (HWIC-2FE), that provide Cisco modular and integrated services routers with additional line-rate Layer 3 routed ports. The following enhancements have been made in Cisco IOS Release 12.4(11)XJ:

- Extended VLAN ID
- HWIC-1FE Routed Port
- HWIC one FE and two FE ports

For more information about these features, see the following documentation:

- *Cisco Interface Cards Hardware Installation Guide*
  http://www.cisco.com/en/US/products/hw/modules/ps2641/products_module_installation_guide_book09186a0080692b21.html
- *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*
  http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html

HWIC-4SHDSL, HWIC-2SHDSL Support

The G.SHDSL HWICs support up to four pairs of digital subscriber lines (DSL): two inverse multiplexing over ATM (IMA) lines, and two ATM segmentation and reassembly (SAR) lines. The four DSL pairs are bundled in groups and configured in the Cisco IOS command-line interface (CLI) by using the **dsl-group** command.

- The HWIC-2SHDSL provides two ports of connectivity through one RJ-11 connector. The HWIC-2SHDSL supports 1-Pair groups or 2-Pair groups.
- The HWIC-4SHDSL provides four ports of connectivity through one RJ-45 connector. The HWIC-2SHDSL combines four ports of data into one line or two lines with either inverse multiplexing over ATM (IMA) groups or M-Pair groups, and it supports 1-Pair groups or 2-Pair groups.

NM-1A-T3/E3

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/atm_e3t3.htm

NME-WAE-522

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/routers/access/interfaces/nm/hardware/installation/guide/waasnme.html

New Software Features Supported in Cisco IOS Release 12.4(15)T

This section describes new and changed features in Cisco IOS Release 12.4(15)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS

Release 12.4(15)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Access Point Link Role Flexibility
- Advanced Encryption Standard (AES) - CCMP
- Bidirectional Forwarding Detection (BFD) Standard Implementation
- Broadcast Key Rotation
- Cisco IOS Auto-Upgrade Manager
- Cisco IOS VoiceXML Browser Update to W3C VoiceXML 2.1
- Cisco IP VSAT Satellite WAN Network Module (NM-1VSAT-Gilat)
- Cisco Unified Communications Manager Express
- Cisco Unified Communications Manager Express SIP Station-Side Enhancements
- Cisco Unified Survivable Remote Site Telephony SIP Station-Side Enhancements
- CNS Config Retrieve Enhancement with Retry and Interval
- Command Scheduler (KRON) Policy for System Startup
- E911 Services for SRST
- Enhanced Hosted NAT Traversal and IP Call Leg Statistics for Session Border Controller (SBC)
- Extended VLAN ID
- IEEE 802.1x Authenticator
- IEEE 802.1x Local Authentication for Cisco LEAP
- IEEE 802.1x Local Authentication for EAP-FAST
- IEEE 802.3ah, Ethernet OAM
- IGMP Version 3
- iLBC Support for SIP and H.323
- ISDN QEP
- MANET: PPPoE Support for Credit Flow and Metrics on Router-to-Radio Links
- Media Resource Control Protocol (MRCP) Version 2
- Microsoft WPS IE SSIDL
- Multi-Party Conferencing Enhancements for Cisco Unified CallManager Express
- Multiple Basic Service Set ID (BSSID)
- Multiple PPPoE Client
- NAC - L2 IEEE 802.1x
- Outbound Proxy Support for the SIP Gateway
- Protected Port on PAN HWIC on Modular Integrated Services Routers
- Secure HTTP Client (SSL) for Cisco IOS VxML Browser
- SIP REFER Outside the Scope of a Dialog Created with a SIP INVITE
- SIP:SIP Support for Asymmetric SDP

- SIP:SIP Support for PAI
- SIP:SIP Support for SRTP
- Support for MGCP CAS Packages on AS5400 and AS5350 Series
- Transparent Bridging Support for Authentication Proxy
- Universal Client Mode
- USB boot
- USB eToken 64KB Smartcard Support
- VLAN Assignment By Name
- VRF-Aware H.323 and SIP for Voice Gateways
- Wi-Fi Multimedia (WMM) Required Elements
- Wireless Enhancements for Integrated Services Routers
- Wireless Non-Root Bridge

Access Point Link Role Flexibility

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Advanced Encryption Standard (AES) - CCMP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Bidirectional Forwarding Detection (BFD) Standard Implementation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122sx/12218sxe/fs_bfd.htm

Broadcast Key Rotation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Cisco IOS Auto-Upgrade Manager

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/os_aumst.htm

Cisco IOS VoiceXML Browser Update to W3C VoiceXML 2.1

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/vxml21.htm

Cisco IP VSAT Satellite WAN Network Module (NM-1VSAT-Gilat)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_14/gtstltnm.htm

Cisco Unified Communications Manager Express

Cisco Communication Manager Express (formerly known as Cisco Unified CallManager Express) delivers two key features:

- Extension Assigner which allows for easy deployment or replacement of phones on site using a TCL IVR Application
- New IP Phone localizations for Asia and Eastern Europe

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_configuration_guide_book09186a00807c5776.html

Cisco Unified Communications Manager Express SIP Station-Side Enhancements

Cisco Unified Communications Manager Express (formerly known as Cisco Unified CallManager Express) SIP Station-Side Enhancements include:

- music on hold
- dialplan-pattern
- KPML and dial plan
- speed dial
- caller ID and status line update
- line status subscription providing presence with authorization and authentication
- busy lamp field (BLF) for speed dial and missed call lists, and phone directories button
- provisioning for Cisco Unified IP Phone 7970G, 7971GE, 7941G/GE, 7961G/GE, and 7911G SIP IP phones

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_configuration_guide_book09186a00807c5776.html

Cisco Unified Survivable Remote Site Telephony SIP Station-Side Enhancements

Cisco Unified Survivable Remote Site Telephony (SRST) SIP feature enhancements include:

- caller ID update

- status line update
- dial plan-pattern
- KPML and dial plan
- idle status prompt with customizable message
- line status subscription providing presence with authorization and authentication

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps2169/products_installation_and_configuration_guides_list.html

CNS Config Retrieve Enhancement with Retry and Interval

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/tcnsretr.htm

Command Scheduler (KRON) Policy for System Startup

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/tkronsch.htm

E911 Services for SRST

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/voice_ip_comm/cusrst/admin/sccp_sip_srst/configuration/guide/SCCP_and_SIP_SRST_Admin_Guide.html

Enhanced Hosted NAT Traversal and IP Call Leg Statistics for Session Border Controller (SBC)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/vvfax_c/callc_c/h323_c/ipipgw/

Extended VLAN ID

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/ht_xvlan.htm

IEEE 802.1x Authenticator

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm#wp1207975

IEEE 802.1x Local Authentication for Cisco LEAP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

IEEE 802.1x Local Authentication for EAP-FAST

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

IEEE 802.3ah, Ethernet OAM

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sr/newft/122sra33/srethoam.htm

IGMP Version 3

Support for the Internet Group Management Protocol Version 3 (IGMPv3) feature was added on the Cisco 87x and the Cisco 1800 series Integrated Services Routers (ISRs) and on EtherSwitch high-speed WAN interface cards (HWICs) and EtherSwitch network modules running on the Cisco 1841, 2800, and 3800 series ISRs.

Note Source Specific Multicast (SSM), IGMPv3 explicit host tracking, and IGMPv3 fast-leave processing are not supported on these platforms, EtherSwitch HWICs, and EtherSwitch network modules.

IGMPv3 provides supports for source filtering, which enables a multicast receiver host to signal to a router which groups it wants to receive multicast traffic from, and from which sources this traffic is expected. Enabling the IGMPv3 feature with IGMP snooping on Cisco ISRs provides Basic IGMPv3 Snooping Support (BISS). BISS provides constrained flooding of multicast traffic in the presence of IGMPv3 hosts. This support constrains traffic to approximately the same set of ports as regular IGMPv2 snooping does with IGMPv2 hosts. The constrained flooding only considers the destination multicast address.

In support of the IGMPv3 feature in Cisco IOS Release 12.4(15)T, the **groups** and **count** keywords were added to the **show ip igmp snooping** command and the output of the **show ip igmp snooping command** was modified to include global information about IGMP snooping groups. Use the **show ip igmp snooping** command with the **groups** keyword to display the multicast table learned by IGMP snooping for all VLANs or the **show ip igmp snooping** command with the **groups** keyword, **vlan-id** keyword, and *vlan-id* argument to display the multicast table learned by IGMP snooping for a specific VLAN. Use the **show ip igmp snooping** command with the **groups** and **count** keywords to display the number of multicast groups learned by IGMP snooping.

iLBC Support for SIP and H.323

The iLBC Supports for SIP and H.323 feature supports the internet Low Bitrate Codec (iLBC), a standard, high-complexity speech codec that is suitable for robust voice communication over IP. This codec is supported on both SIP and H.323.

For detailed information about this feature, see the "Dial Peer Overview" chapter and "Dial Peer Features and Configuration" chapter in *Dial Peer Configuration on Voice Gateway Routers*.

ISDN QEP

The ISDN QEP feature introduces the **isdn layer2-flap** command. When you include the **isdn layer2-flap** command in the ISDN configuration, the router (as a user agent) sends a RESTART or STATUS-ENQUIRY message to the remote peer when a Layer 2 flap and recovery occurs. This notification enhances the gateway's ability to gracefully recover from a Layer 2 flap or failure error condition. This graceful recovery frees gateway resources to handle future calls and to increase the call completion rate.

Use the **isdn layer2-flap** command with the **isdn timer t309** command in your configuration. The **isdn timer t309** command enables the router to hold or drop calls. The effect of using these two commands in the event of a Layer 2 flap and recovery is summarized as follows:

- Layer 2 failure and then a Layer 2 recovery before the T309 timer expires (with T309 timer enabled)—STATUS-ENQUIRY message
- Layer 2 failure and then a Layer 2 recovery after the T309 timer expires or with the T309 timer not enabled—RESTART message

MANET: PPPoE Support for Credit Flow and Metrics on Router-to-Radio Links

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/timo_c/ip_manet.htm

Media Resource Control Protocol (MRCP) Version 2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/mrcpv2.htm

Microsoft WPS IE SSIDL

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Multi-Party Conferencing Enhancements for Cisco Unified CallManager Express

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_configuration_guide_book09186a00807c5776.html

Multiple Basic Service Set ID (BSSID)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Multiple PPPoE Client

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124cg/hbba_c/part02/hpppoec.htm

NAC - L2 IEEE 802.1x

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/security/nac/2.1/release_notes/NAC21RN.html

Outbound Proxy Support for the SIP Gateway

The Outbound Proxy Support for the SIP Gateway feature configures an outbound-proxy server that receives all initiating request (INVITE and SUBSCRIBE) messages and routes them to the designated destination. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/proxstub.htm

Protected Port on PAN HWIC on Modular Integrated Services Routers

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/htproprt.htm

Secure HTTP Client (SSL) for Cisco IOS VxML Browser

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/sechttp.htm

SIP REFER Outside the Scope of a Dialog Created with a SIP INVITE

Out-of-dialog REFER (OOD-R) allows remote applications to establish calls by sending a REFER message to a SIP gateway without an initial INVITE. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/refrstub.htm

SIP:SIP Support for Asymmetric SDP

The SIP Support for Asymmetric SDP feature configures SIP gateways to send and receive Dual Tone Multi-Frequency (DTMF) and dynamic codec Real Time Protocol (RTP) packets with different payloads. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/sdpstub.htm

SIP:SIP Support for PAI

The SIP Support for PAI feature provides support for RFC 3323 and RFC 3325 that allows you to enable either P-Asserted-Identity (PAI) or P-Preferred-Identity (PPI) privacy headers in outgoing SIP request or response messages to assert the identity of authenticated users in trusted domains. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/paistub.htm

SIP:SIP Support for SRTP

The Secure Real-Time Transfer protocol (SRTP) is an extension of the Real-Time Protocol (RTP) Audio/Video Profile and ensures the integrity of RTP and Real-Time Control Protocol (RTCP) packets providing authentication, integrity, and encryption of media packets between two SIP endpoints. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/srtpstub.htm

Support for MGCP CAS Packages on AS5400 and AS5350 Series

The MGCP channel-associated signaling (CAS) MD Package feature can now be configured on the Cisco AS5350, Cisco AS5350XM, Cisco AS5400XM, and Cisco AS5400HPX in Cisco IOS Release 12.4(15)T. This feature is still supported on the Cisco AS5850.

This feature supports Feature Group D (FGD) Exchange Access North American (EANA) protocol signaling and automatic number identification (ANI) and dialed number identification service (DNIS) digits reporting, which enables the MGCP call agent to better handle customer billing. Additional features that are supported in this feature package include the following:

- DTMF trunk support (for channel-associated-signaling [CAS] endpoints)
- Multifrequency operator services support
- Multifrequency Wink Start and Immediate Start support

For more information, see the Configuring MGCP CAS MD Package chapter of the *Cisco IOS MGCP and Related Protocols Configuration Guide* at http://www.cisco.com/en/US/docs/ios/12_3/vvf_c/cisco_ios_mgcp_and_related_protocols_configuration_guide/xgcp_c.html.

Transparent Bridging Support for Authentication Proxy

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/trans_ap.htm

Universal Client Mode

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

USB boot

The USB Boot feature supports booting from ROMMON and IOS. Platforms can boot from USB in ROM monitor with or without a compact flash device. It is not necessary to use a bootloader image from the compact flash device. Partitions, such as usbflash0:2:image_name, are not supported on USB flash drives.

For more information on this feature, see:

http://www.cisco.com/en/US/prod/collateral/modules/ps6247/prod_qas0900aecd80232483.html

USB eToken 64KB Smartcard Support

The Cisco universal serial bus (USB) eToken 64KB smartcard support feature enables device authentication and simplifies the deployment and secure configuration of Cisco routers. It uses smart card technology in a USB form factor to facilitate the authentication and configuration process. The token provides secure access to the route. The token and a PIN are necessary to access the configuration, keys, and credentials.

Some Cisco access router models have USB ports that can be used with Cisco USB flash memory modules or with the Aladdin USB eToken Pro key. These USB modules can be used with a supported Cisco access router for the following functions:

- USB eToken Pro key provides a secure means of storing and deploying information, such as a bootstrap configuration or VPN credentials, apart from the router chassis. The USB eToken uses smart card technology to protect a small area of memory.
- The USB eToken grants access using a personal identification number (PIN). When IP Security (IPSec) VPN credentials are stored on the USB eToken, they are outside the router. When the USB eToken is inserted in a USB port, and when the user enters the PIN and unlocks the USB eToken, the user retrieves the credentials and copies them into running memory. When the USB eToken is removed, the router erases the credentials from running memory, ensuring that they cannot be retrieved from the router itself.

For more information, see:

http://www.cisco.com/en/US/prod/collateral/modules/ps6247/prod_qas0900aecd80232483.html

VLAN Assignment By Name

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

VRF-Aware H.323 and SIP for Voice Gateways

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t15/vrfawvgw.html

Wi-Fi Multimedia (WMM) Required Elements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

Wireless Enhancements for Integrated Services Routers

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t15/wrlsstub.htm

Wireless Non-Root Bridge

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1800fix/scg/index.htm

New Hardware Features Supported in Cisco IOS Release 12.4(11)T

This section describes new and changed features in Cisco IOS Release 12.4(11)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(11)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

Cisco 3270 Rugged Router

The Cisco 3270 router is the high-performance member of the Cisco 3200 Series router family. These devices are designed to provide wired and wireless network connectivity in harsh environments, such as police cars, military vehicles, trains, airborne vehicles, and outdoor locations that are exposed to the elements.

Cisco IOS 4096-Bit Public Key Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/st_pkiky.htm

HWIC-CABLE-D-2, HWIC-CABLE-E/J-2

For detailed information about this feature, see the *Cisco Cable Modem High-Speed WAN Interface Cards Configuration Guide.*

NPE-G2 Network Processing Engine

The Network Processing Engine NPE-G2 is the latest and highest performing routing engine with largest scalability within the network processing engines family for the Cisco 7200VXR Series. A new chip design on the NPE-G2 offers up to double of the performance compared to the NPE-G1 network processing engine. This great performance improvement with the NPE-G2 makes it an ideal Cisco 7200 solution for new aggregation services for the enterprise as well as service provider segment.

The NPE-G2 offers following benefits:

- Provides double the performance compared to the Cisco 7200 VXR NPE-G1—Up to 2 million packets per second (pps) in Cisco Express Forwarding (CEF)

- Offers three 10/100/1000 Mbps copper Ethernet ports and optical ports (10/100/1000 Mbps over copper or 1000 Mbps over industry-standard SFP) for LAN/WAN connectivity
- Provides two USB ports for general storage and security token storage
- Provides one dedicated 10/100-Mbps copper Ethernet port for management
- Offers 1 GB of DRAM memory by default and 2 GB DRAM is available as an option (which makes the Cisco 7200 Series, for example, ideal as Route Reflector, Master Controller of OER (Optimized Edge Routing), IP SLA, etc.)
- Eliminates the requirement for an I/O controller
- Extends the use of the available I/O slot for a single port adapter in combination with the Port Adapter Jacket Card (C7200-JC-PA) or a Cisco 7200VXR VPN Services Adapter (C7200-VSA)
- Offers greatly improved price/performance ratio

Note An I/O controller module can be used with the NPE-G2, but it is not necessary for system functionality. Installing an I/O controller in a Cisco 7200VXR chassis with the NPE-G2 activates the console and auxiliary ports on the I/O controller and automatically disables the console and auxiliary ports the NPE-G2. However, you can still use the CompactFlash Disk slots and Ethernet ports on both the NPE-G2 and I/O controller when both cards are installed.

PA-MC-T3-EC and PA-MC-2T3-EC

The PA-MC-T3-EC is a single-width port adapter that comes in both a one-port version, PA-MC-T3-EC and two port version, PA-MC-2T3-EC. It supports both a channelized mode of operation, and an unchannelized mode of operation.

Cisco 1- and 2-Port Multichannel Enhanced Capability Port Adapters provide hardware offload support of Multilink Point-to-Point Protocol (MLPPP), Multilink Frame Relay (MLFR), link fragmentation and interleaving (LFI), and FRF.12 at T3 line rate.

For detailed information, see the Cisco 1- and 2-Port Multichannel Enhanced Capability Port Adapters data sheet:

http://www.cisco.com/en/US/products/hw/modules/ps2033/products_data_sheet0900aecd8054951d.html

Port Adapter Jacket Card

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/prod/collateral/routers/ps341/prod_qas0900aecd8045055e.html

VPN Services Adapter Module

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/core/7200vx/portadpt/service/vsa/index.htm

New Software Features Supported in Cisco IOS Release 12.4(11)T

This section describes new and changed features in Cisco IOS Release 12.4(11)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(11)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- 2547oDMVPN—Enabling Traffic Segmentation within DMVPN
- Any Transport over MPLS (AToM): ATM OAM Emulation
- Any Transport over MPLS (AToM): Ethernet over MPLS
- Any Transport over MPLS (AToM): Ethernet over MPLS: Port Mode
- Any Transport over MPLS (AToM): Frame Relay over MPLS (FRoMPLS)
- AToM Graceful Restart
- BGP: Dynamic Neighbor Advertisement Tracking
- BGP Neighbor Policy
- BGP Per Neighbor SoO Configuration
- Cisco Express Forwarding Support for Layer 4 Port-Based Load Balancing
- Cisco Group Encrypted Transport VPN
- Cisco IOS USB Token PKI Enhancements—Phase 2
- Cisco IOS VoiceXML 2.0
- Cisco Quality ID
- Cisco Unified CallManager Express 4.0(3) New Features
- Configuration Logger Persistency
- DHCP Class Support for Client Identification
- DHCP Option 82 on Stacked EtherSwitch Modules
- DHCPv4 Relay per Interface VPN ID Support
- DTMF Relay, Fax Relay and Modem Relay for SCCP FXS Ports in Cisco IOS
- Easy VPN Phase 8.0
- EcRTP over FRF.20 and FRF.20 over Frame Relay VC Bundles
- Enhanced Object Tracking Support for Mobile IP, PDSN or GGSN
- Exclusive Configuration Change Access and Access Session Locking
- Feature Mode for SCCP FXS Ports in Cisco IOS
- FHRP-HSRP BDF Peering
- Field-Programmable Device Upgrades
- H.323 RAS Support in Cisco IOS Firewall
- H.323 to SIP Supplementary Feature Interworking for Session Border Controller (SBC)
- HWIC-1ADSL Supporting the Cisco 1841, Cisco 2800 and Cisco 3800 Platforms

- IEEE 802.1x Authenticator
- IEEE 802.1x Guest VLAN
- IEEE 802.1x MIB Support
- IEEE 802.1x RADIUS Accounting
- IEEE 802.1x Radius-Supplied Session Timeout
- IEEE 802.1x VLAN Assignment
- IEEE 802.1x Voice VLAN
- iLBC Support for SIP and H.323
- iLBC Support on IP-to-IP GW for Flow-Through and Flow-Around Modes
- IOS H.320 Video Gateway
- IPS 5.x Signature Format Support and Usability Enhancements
- L2TPv3 Control Message Hashing
- L2TPv3 Control Message Rate Limiting
- L2VPN Interworking: Ethernet to VLAN Interworking
- L2VPN Interworking: Ethernet VLAN to Frame Relay
- L2VPN Pseudowire Redundancy
- Layer 2 Local Switching: Ethernet to VLAN
- Layer 2 Local Switching—Same-Port Switching for Ethernet VLAN
- Layer 2 Local Switching—Same-Port Switching for Frame Relay
- Load Balancing of H.323 Calls by the Gatekeeper to the Terminating Gateways
- Mobile IP—Mobile IPv6 HA Phase 2
- Mobile IP Support for RFC 3519 NAT Traversal on the Mobile Router
- Mobile Wireless Group (MWG) Home Agent Release 3.0
- MPLS Embedded Management—LSP Ping/Traceroute for LDP
- Multilink Frame Relay over L2TPv3/AToM
- Network Admission Control (NAC) Auth Fail Open
- Outward Facing MEP
- Packet Data Serving Node Release 3.0
- Protocol Demultiplexing for L2TPv3
- Pseudowire Emulation Edge-to-Edge MIBs for Ethernet, Frame Relay, and ATM Services
- RADIUS Server Load Balancing
- Reliable Delivery for Syslog over BEEP
- RFC 2833 Dual-Tone Multifrequency Media Termination Point Passthrough
- Router IP Traffic Export Packet Capture Enhancements
- SCTP Show/Clear CLI Enhancements
- Show and Clear Commands for IOS Sockets
- SIP MWI NOTIFY—QSIG MWI Translation
- SIP Support for Hookflash

- Smartports on ISR EtherSwitch
- SSL VPN Application ACL support
- SSL VPN Debug Tool Infrastructure
- SSL VPN Netegrity Single Sign-on (SSO) Support
- SSL VPN: Port-Forward Enhancements
- SSL VPN URL obfuscation
- Suppressing EXEC Accounting Records
- Switch Virtual Interface (SVI) Support on Switch Ports
- Symmetrical RTP Support for MGCP Based Calls
- Tunnel Route Selection
- USB Storage
- USB Storage PKI Enhancements
- User Defined Source Port Ranges for PAT
- VLAN ID Rewrite
- VLAN.DAT to NVGEN
- VMWI for SCCP FXS Ports

2547oDMVPN—Enabling Traffic Segmentation within DMVPN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t13/ftgreips.htm

Any Transport over MPLS (AToM): ATM OAM Emulation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsatom28.htm

Any Transport over MPLS (AToM): Ethernet over MPLS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsatom28.htm

Any Transport over MPLS (AToM): Ethernet over MPLS: Port Mode

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsatom28.htm

Any Transport over MPLS (AToM): Frame Relay over MPLS (FRoMPLS)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsatom28.htm

AToM Graceful Restart

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s29/fsgratom.htm

BGP: Dynamic Neighbor Advertisement Tracking

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/iproute/command/reference/irp_book.html

BGP Neighbor Policy

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/htbgpnp.html

BGP Per Neighbor SoO Configuration

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/htbgpsoo.html

Cisco Express Forwarding Support for Layer 4 Port-Based Load Balancing

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/cefl4lb.htm

Cisco Group Encrypted Transport VPN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/htgetvpn.htm

Cisco IOS USB Token PKI Enhancements—Phase 2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/st_pkip2.htm

Cisco IOS VoiceXML 2.0

For detailed information about this feature, see the "Configuring Basic Functionality for Tcl IVR and VoiceXML Applications" chapter of the *Cisco Tcl IVR and VoiceXML Application Guide* and "Cisco VoiceXML Features" and "Cisco VoiceXML Elements: Reference Table" chapters of the *Cisco VoiceXML Programmer's Guide.*

Cisco Quality ID

Cisco IOS Release 12.4(11)T supports the Cisco Quality ID feature in Cisco transceivers (Gigabit Interface Converter [GBIC] or small form factor pluggables [SFP]) on the NPE-G2 for Cisco 7200 VXR routers.

The Cisco Quality ID feature primarily consists of the following components: 1) a unique encrypted code in the GBIC module or SFP module which enables Cisco IOS to identify Cisco-pluggable parts, and 2) the ability of Cisco IOS to enable only those ports populated with Cisco parts. The Cisco Quality ID feature allows customers to have confidence that the GBIC modules or SFP modules being deployed are certified to be compatible with the Cisco network device in which they are being deployed.

Cisco Unified CallManager Express 4.0(3) New Features

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_feature_guide09186a008070cfef.html#wp1220686

Configuration Logger Persistency

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sr/newft/122sra33/srmgtint.htm

DHCP Class Support for Client Identification

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/htoption.htm

DHCP Option 82 on Stacked EtherSwitch Modules

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/nmdhcp.htm

DHCPv4 Relay per Interface VPN ID Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/htdhpvpn.htm

DTMF Relay, Fax Relay and Modem Relay for SCCP FXS Ports in Cisco IOS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xe6/htrelay.htm

Easy VPN Phase 8.0

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm#wp1276737

EcRTP over FRF.20 and FRF.20 over Frame Relay VC Bundles

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htfrf20.htm

Enhanced Object Tracking Support for Mobile IP, PDSN or GGSN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/eot_mip.htm

Exclusive Configuration Change Access and Access Session Locking

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_14/gt_exclu.htm

Feature Mode for SCCP FXS Ports in Cisco IOS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xe6/htfeatmd.htm

FHRP-HSRP BDF Peering

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/hsrpbfd.htm

Field-Programmable Device Upgrades

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xd4/fpd.htm

H.323 RAS Support in Cisco IOS Firewall

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_rasfw.htm

H.323 to SIP Supplementary Feature Interworking for Session Border Controller (SBC)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/vvfax_c/callc_c/h323_c/ipipgw/

HWIC-1ADSL Supporting the Cisco 1841, Cisco 2800 and Cisco 3800 Platforms

This is an incremental set of Quality of Service (QoS) features that allow customers to deploy differentiated services on ADSL/ADSL2/ADSL2+ lines with the HWIC-1ADSL WAN Interface Card (WIC) on the modular Cisco 1800, 2800 and 3800 series integrated services routers. This complements the rich set of IP and ATM QoS features already supported on the platforms with an ADSL2+ interface. These additional features allow users, applications and traffic to get appropriate Service Level Agreements (SLA) as well as provide service providers with opportunities for incremental revenue generation through differentiated services.

Today, QoS is an important infrastructure component that facilitates the widespread adoption of broadband in SMB and enterprise branch office environments. In response to customer requirements and pressures, network operators and service providers are finding it critical to offer QoS features for DSL deployments. This release enables service providers with their ADSL2+ deployments with a critical set of features such as:

- Support for UBR+ class of service
- Multi queue support
- ATM oversubscription for DSL

UBR+ Support

Traditionally the unspecified bit rate (UBR) service class has been used for data communications applications such as file transfer and email. UBR is a best effort service and is the lowest class of service in the ATM service class hierarchy. There are no guarantees to the actual bandwidth allowed. Therefore, UBR virtual circuits (VCs) are susceptible to a large number of cell drops or a high cell transfer delay as cells move from the source to the destination. Unspecified bit rate plus (UBR+) is a special ATM service class designed to provide a minimum bandwidth guarantee. With UBR+, the ADSL ATM interface has the ability to assure a minimum as well as maximum bandwidth on the line. As a result, the user can have some assurance of a range of bandwidth values necessary for QoS.

Multiqueue Support

Today's access networks are increasingly carrying voice, video and data traffic over physical lines. Thus it is crucial for the access routers to honor latency, jitter and other requirements for delay sensitive traffic. The multiqueue feature provides for 2 separate hardware queues on the access router for every permanent virtual circuit (PVC) in the system, one to carry high priority and the other to carry regular (data) traffic.

ATM Oversubscription for DSL

Today, more and more business customers demand high availability in the networks. In many cases they use primary as well as secondary WAN interfaces for 24x7 connectivity. In ADSL networks, loss of connectivity may arise when the ADSL line is down or when the PVC is non-functional because of equipment failure in core networks. In order to overcome the challenges posed by the latter case, service providers are increasingly deploying primary and backup PVCs on the ADSL interface. However with a backup PVC, the configurable bandwidth requirement of all the PVCs in the system may be greater than the ADSL line rate. This may cause PVCs that need minimum bandwidth guarantees to be downgraded to a UBR class of service. The ATM Oversubscription feature allows the operator to configure oversubscription on the ADSL interface up to a defined bandwidth. The operator can configure variable bit rate (VBR) and unspecified bit rate plus (UBR+) service classes for PVC connections with a sum of sustainable cell rates (SCRs) greater than the line rate. Resource limitations on Cisco xDSL interfaces require a way to configure bandwidth oversubscription up to a defined bandwidth (a finite oversubscription of bandwidth by a factor of 2).

IEEE 802.1x Authenticator

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x Guest VLAN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x MIB Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x RADIUS Accounting

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x Radius-Supplied Session Timeout

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x VLAN Assignment

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

IEEE 802.1x Voice VLAN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_8021x.htm

iLBC Support for SIP and H.323

For detailed information about this feature, see the "Dial Peer Overview" chapter and "Dial Peer Features and Configuration" chapter in Dial Peer Configuration on Voice Gateway Routers.

iLBC Support on IP-to-IP GW for Flow-Through and Flow-Around Modes

For detailed information about this feature, see the "Dial Peer Overview" chapter and "Dial Peer Features and Configuration" chapter in Dial Peer Configuration on Voice Gateway Routers.

IOS H.320 Video Gateway

For detailed information about this feature, see Integrating Data, Voice, and Video Services.

IPS 5.x Signature Format Support and Usability Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ips_v5.htm

L2TPv3 Control Message Hashing

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s31/l2tpv31s.htm

L2TPv3 Control Message Rate Limiting

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s31/l2tpv31s.htm

L2VPN Interworking: Ethernet to VLAN Interworking

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s26/fsinterw.htm

L2VPN Interworking: Ethernet VLAN to Frame Relay

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s26/fsinterw.htm

L2VPN Pseudowire Redundancy

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s31/fspseudo.htm

Layer 2 Local Switching: Ethernet to VLAN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s27/fslocal.htm

Layer 2 Local Switching—Same-Port Switching for Ethernet VLAN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s27/fslocal.htm

Layer 2 Local Switching—Same-Port Switching for Frame Relay

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s27/fslocal.htm

Load Balancing of H.323 Calls by the Gatekeeper to the Terminating Gateways

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/vvfax_c/callc_c/h323_c/323confg/index.htm

Mobile IP—Mobile IPv6 HA Phase 2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t13/ipv6_vgf.htm

Mobile IP Support for RFC 3519 NAT Traversal on the Mobile Router

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xe6/htmipmar.htm

Mobile Wireless Group (MWG) Home Agent Release 3.0

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcr/tmwh_r/index.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/tmwh_c/index.htm

MPLS Embedded Management—LSP Ping/Traceroute for LDP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_lspng.htm

Multilink Frame Relay over L2TPv3/AToM

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsmfrl2.htm

Network Admission Control (NAC) Auth Fail Open

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_nacaf.htm

Outward Facing MEP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/srethcfm.htm

Packet Data Serving Node Release 3.0

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcr/tmwp_r/index.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/chap1.htm

Protocol Demultiplexing for L2TPv3

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s31/l2tpv31s.htm

Pseudowire Emulation Edge-to-Edge MIBs for Ethernet, Frame Relay, and ATM Services

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sb/newft/122sb28/sbpweatm.htm

RADIUS Server Load Balancing

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sb/newft/122sb28/sbrdldbl.htm

Reliable Delivery for Syslog over BEEP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/htnmsylg.htm

RFC 2833 Dual-Tone Multifrequency Media Termination Point Passthrough

For detailed information about this feature, see The Configuring SIP DTMF Features chapter in the *Cisco IOS SIP Configuration Guide*.

Router IP Traffic Export Packet Capture Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_rawip.htm

SCTP Show/Clear CLI Enhancements

The SCTP Show/Clear CLI enhancements provide access to additional SCTP information that can help with troubleshooting potential problems. These enhancements also make the updated SCTP **show** and **clear** commands consistent with the CLI of other transport protocols.

For more information about this feature, see the *Cisco IOS Voice Command Reference*.

Show and Clear Commands for IOS Sockets

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_shows.htm

SIP MWI NOTIFY—QSIG MWI Translation

For detailed information about this feature, see The Configuring SIP MWI Features chapter in the *Cisco IOS SIP Configuration Guide*.

SIP Support for Hookflash

For detailed information about this feature, see The Configuring SIP Support for Hookflash chapter in the *Cisco IOS SIP Configuration Guide.*

Smartports on ISR EtherSwitch

Smartports macros are supported in EtherSwitch network modules that are installed in a Cisco Integrated Service Router (ISR). The EtherSwitch network module is a high-density voice network module that provides Layer 2 switching across Ethernet ports. Smartports macros, also known as role-based macros, are sequences of CLI commands that enable features and configure settings on a switch port. Because they support an easily repeatable mechanism for enabling features and configuring settings, Smartports macros provide a simple method for configuring switch ports based on the location of the switch within the network. Smartports macros are also useful for customizing specific switch port configurations for mass deployment.

When you apply a Smartports macro on an EtherSwitch module or interface, the CLI commands within the macro are configured both on the target interface (or interfaces) and on any existing module or interface configurations. The new commands are added to the interface and are saved in the running configuration file.

Six default Smartports macros are provided as part of the Cisco IOS software. Each of these macros configures features suitable for connecting a switch port to a specific type of device:

- The **cisco-global** global macro configures a switch in global configuration mode.
- The **cisco-desktop** interface macro configures a port connected to a standard desktop.
- The **cisco-phone** interface macro configures a port connected to a standard desktop and Cisco IP phone.
- The **cisco-router** interface macro configures a port connected to a Cisco router.
- The **cisco-switch** interface macro configures a port connected to a Cisco switch.
- The **cisco-wireless** interface macro configures a port connected to a Wireless Access Point.

Although you cannot modify the default Smartports macros, you can create any number of customized Smartports macros. Customized macros can be tailored to define alternative or customized switch port configuration profiles.

SSL VPN Application ACL support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

SSL VPN Debug Tool Infrastructure

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

SSL VPN Netegrity Single Sign-on (SSO) Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

SSL VPN: Port-Forward Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

SSL VPN URL obfuscation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

Suppressing EXEC Accounting Records

For detailed information about this feature, see the Configuring AAA for VPDNs chapter in the *Cisco IOS VPDN Configuration Guide*.

Switch Virtual Interface (SVI) Support on Switch Ports

On the Cisco 871 router, you can use the Switch Virtual Interface (SVI) feature to configure multiple switch ports to function as one Layer 3 router port. You can then configure VPN access control using IEEE 802.1X authentication on the SVI. While this configuration is deployed, you should not configure the standard switch port IEEE 802.1x configuration on the same ports.

Symmetrical RTP Support for MGCP Based Calls

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_6974s.htm

Tunnel Route Selection

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_trsel.htm

USB Storage

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/st_usbg2.htm

USB Storage PKI Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/st_pkig2.htm

User Defined Source Port Ranges for PAT

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t11/ht_pat.htm

VLAN ID Rewrite

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/fsatom28.htm

VLAN.DAT to NVGEN

The VLAN.DAT to NVGEN feature enables you to save VLAN database configuration information for EtherSwitch network modules installed in a Cisco Integrated Service Router (ISR) in a single configuration file. The EtherSwitch network module is a high-density voice network module that provides Layer 2 switching across Ethernet ports. This feature enables network administrators of modular switches that contain VLAN information to back up the switch system in a single configuration file stored in NVRAM, rather than with multiple configuration files. With versions of Cisco IOS software prior to Release 12.4(11)T, VLAN database configuration information is stored in the compact flash memory in a VLAN.dat file and is not included in the startup configuration file. To save and restore a complete backup of a modular switch system with versions of Cisco IOS software prior to Release 12.4(11)T, you must manage both the startup configuration and VLAN.dat files.

With the introduction of this feature, an ISR EtherSwitch that uses the VLAN.DAT to NVGEN feature is in VTP server mode by default. When the switch is in VTP server mode, you can save the VLAN information to the VLAN.dat file only. To save the VLAN database configuration information to NVRAM instead, first use the **vtp transparent** global configuration command to set the device to the transparent VTP device mode; configuring the switch as VTP transparent disables VLAN Trunking Protocol (VTP) from the VTP management domain but does not remove the domain from the switch. Then configure VLAN information in the new config-vlan command mode. The VLAN database configuration information will be included in the startup configuration file that is generated by the nonvolatile generation (NVGEN) process invoked by the **copy running-config** command.

Note For backward compatibility, Cisco IOS software continues to support the original method, in which VLAN information is configured in global configuration mode and stored in a separate VLAN.dat configuration file.

VMWI for SCCP FXS Ports

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xe6/htvmwi.htm

New Hardware Features Supported in Cisco IOS Release 12.4(9)T

This section describes new and changed features in Cisco IOS Release 12.4(9)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(9)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- Cisco PVDMII-12DM, PVDMII-24DM, and PVDMII-36DM Digital Modem Packet Voice Data Modules
- DES/3DES/AES VPN Encryption Module (AIM-VPN/SSL-1, AIM-VPN/SSL-2, and AIM-VPN/SSL-3
- High-Density Packet Voice Feature Card for Cisco AS5350XM and AS5400XM Universal Gateways

Cisco PVDMII-12DM, PVDMII-24DM, and PVDMII-36DM Digital Modem Packet Voice Data Modules

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htpvdm2.htm

DES/3DES/AES VPN Encryption Module (AIM-VPN/SSL-1, AIM-VPN/SSL-2, and AIM-VPN/SSL-3

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htvpnssl.htm

High-Density Packet Voice Feature Card for Cisco AS5350XM and AS5400XM Universal Gateways

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xc4/vfc_dsp.htm

New Software Features Supported in Cisco IOS Release 12.4(9)T

This section describes new and changed features in Cisco IOS Release 12.4(9)T. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(9)T. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Access List-Based RBSCP
- Application Inspection and Control for HTTP—Phase 2
- BFD Echo Mode

- BFD Version 1 Support
- Cache Control Enhancements for Certification Revocation Lists
- Call Detail Records (CDRs) Feature Correlation ID for Supplementary Features
- Cisco CallManager Express (CME) 4.0(1)
- Cisco IOS Flexible NetFlow
- Cisco IOS Hosted NAT Traversal for Session Border Controller Phase-1
- CNS—Security Enhancement
- Customizable PSTN Tones and H.323 Call-Disconnect Cause Codes0
- Diameter Credit Control Application
- EasyVPN Phase 7.1
- Enhanced MF for FGD and Analog CAMA Trunks
- EOT Support for Carrier Delay
- Ethernet Local Management Interface
- Extending Dynamic Zone Prefix Registration to Include Gateway Priority
- FHRP—HSRP Group Shutdown
- Flow-Based QoS for GGSN
- Frame Relay Conditional Debug Support
- Frame Relay show Command and debug Command Enhancements
- FRF 1.2 Annex A Support
- FRF .20 Support
- General Packet Radio Service (GPRS) Release R5.2
- H.323 VoIP Call Preservation Enhancements for WAN Link Failures
- Integrated Data Primary Rate Interface (PRI) Services
- IPHC Profiles
- IPSec Diagnostics Enhancement
- IPsec Virtual Tunnel Interface
- Manageability Enhancements for DMVPN
- MGCP Layer 2 Teardown for IUA DPNSS Trunks
- Mobile IP—Mobile Router Multipath Support
- NAT as SIP Session Border Controller Media Flow
- NAT as SIP Session Border Controller Support for Address-Only Fields
- NETCONF over BEEP
- NETCONF over SSHv2
- OER BGP Inbound Optimization
- OSPF IPv6 (OSPFv3) IPSec ESP Encryption and Authentication
- P2P Application Inspection and Control—Phase 1
- Rate-Limiting Inspected Traffic
- RFC 30 MFR MIB Support

- SCCP Controlled Analog (FXS) Ports with Supplementary Features in Integrated Services Routers and VG224 Voice Gateways for Cisco IOS Software
- SCCP PLAR with DTMF Out Pulse Digits for FXS Analog Phones
- Secure Communication Between IP-STE Endpoint and Line-Side STE Endpoint
- SIP: SIP Gateway OOB DTMF Support with KPML
- SIP: SIP Gateway Session Timer Support
- SIP: SIP Gateway Support for SDP Session Info and Permit Hostname CLI
- SIP to SIP Supplementary Services for Session Border Controller (SBC)
- Split DNS
- SSL VPN-WebVPN Enhancements
- Survivable Remote Site Telephony Version 4.0
- Video Support for SCCP-Based Endpoints

Access List-Based RBSCP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htarbscp.htm

Application Inspection and Control for HTTP—Phase 2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htzonebp.htm

BFD Echo Mode

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122sx/12218sxe/fs_bfd.htm

BFD Version 1 Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122sx/12218sxe/fs_bfd.htm

Cache Control Enhancements for Certification Revocation Lists

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/t9_cctrl.htm

Call Detail Records (CDRs) Feature Correlation ID for Supplementary Features

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xc4/ht_fcid.htm

Cisco CallManager Express (CME) 4.0(1)

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/tsd_products_support_series_home.html

Cisco IOS Flexible NetFlow

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_onf1.htm

Cisco IOS Hosted NAT Traversal for Session Border Controller Phase-1

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_sbc.htm

CNS—Security Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_cnsse.htm

Customizable PSTN Tones and H.323 Call-Disconnect Cause Codes0

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htcause.htm

Diameter Credit Control Application

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_diam.htm

EasyVPN Phase 7.1

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm

Enhanced MF for FGD and Analog CAMA Trunks

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htmf_fgd.htm

EOT Support for Carrier Delay

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_eotcd.htm

Ethernet Local Management Interface

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htethlmi.htm

Extending Dynamic Zone Prefix Registration to Include Gateway Priority

For detailed information about this feature, see the "Configuring H.323 Gateways" section of the *Cisco IOS H.323 Configuration Guide*.

FHRP—HSRP Group Shutdown

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_hsgrp.htm

Flow-Based QoS for GGSN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htflwqos.htm

Frame Relay Conditional Debug Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s28/12sfrcdb.htm

Frame Relay show Command and debug Command Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122sb/newft/122sbc27/sbfrshow.htm

FRF 1.2 Annex A Support

The FRF 1.2 Annex A Support feature is also called Local Management Interface (LMI) segmentation. It supports an enhancement to the Frame Relay LMI protocol by which LMI full status messages are segmented because of MTU constraints or large numbers of permanent virtual circuits (PVCs). This feature is useful when the maximum MTU size is insufficient to accommodate the large number of PVCs on the link. During Frame Relay internetworking with other Layer 2 protocols, the MTUs on each interface must match. In software that does not have the FRF 1.2 Annex A Support feature, you cannot change the MTU size on the Frame Relay side and place all PVC data in one LMI packet. The FRF 1.2 Annex A Support feature removes this limitation.

The FRF 1.2 Annex A standard adds a new message type “Full status continued” to an LMI packet. When a DCE determines that it cannot fit all PVCs into one packet (enforced by the MTU size), the message type is set to “Full status continued.” The DTE responds immediately to “Full status continued” messages that are sent to this packet instead of waiting for the T391 timer to expire. The DCE sends the remaining PVCs in one or more “Full status continued” messages until all the remaining PVCs can fit into one message. At this point, a normal “Full status” message is sent.

If the DTE receives a “Full status” or “Full status continued” STATUS message in response to a “Full status continued” STATUS ENQUIRY message, this exchange indicates a lower-valued data-link connection identifier (DLCI) than the prior “Full status continued” STATUS message (and is considered to be an error event), and PVC information elements (IEs) are not processed. The next time the T391 timer expires, the “Full status” STATUS ENQUIRY procedure is reinitiated.

This feature follows the FRF 1.2 implementation agreement and allows Cisco IOS software to be compliant with the FRF 1.2 standard. The implementation is platform-independent and applies to all platforms running Cisco IOS software that support Frame Relay. This feature interoperates only with existing Cisco IOS software releases in which all PVCs can be reported in one packet. A router running the new functionality must be able to interoperate with routers that are running existing Cisco IOS software releases and with routers that support the new functionality using the continuation status request and reply frames. Only LMI types Q.933A and ANSI support the FRF 1.2 Annex A standard.

You can track “Full status continued” packets by using the **debug frame-relay lmi** command in privileged EXEC mode. An extra field, 04, has been added to the display output (the last row in the following example indicates where in the report to look for this field):

```
17:42:39: Serial1(out): StEnq, myseq 126, yourseen 125, DTE up
17:42:39: datagramstart = 0x40058DA4, datagramsize = 13
17:42:39: FR encap = 0x00010308
17:42:39: 00 75 51 01 04 53 02 7E 7D
```

The string segment “active/inactive” in the display of the **show interface** commands indicates whether the FRF 1.2 Annex A standard is triggered. The report indicates active when routers receive the “Full status continued” message; otherwise, the report indicates inactive.

FRF .20 Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htfrf20.htm

General Packet Radio Service (GPRS) Release R5.2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ggsn52/index.htm

H.323 VoIP Call Preservation Enhancements for WAN Link Failures

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/h323pres.htm

Integrated Data Primary Rate Interface (PRI) Services

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124limit/124x/124xc4/intserv.htm

IPHC Profiles

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_iphc.htm

IPSec Diagnostics Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htediagn.htm

IPsec Virtual Tunnel Interface

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_14/gtipsctm.htm

Manageability Enhancements for DMVPN

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t13/ftgreips.htm

MGCP Layer 2 Teardown for IUA DPNSS Trunks

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htteardn.htm

Mobile IP—Mobile Router Multipath Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htmultun.htm

NAT as SIP Session Border Controller Media Flow

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_sbc.htm

NAT as SIP Session Border Controller Support for Address-Only Fields

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/ht_sbc.htm

NETCONF over BEEP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htnetbe.htm

NETCONF over SSHv2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/srnetcon.htm

OER BGP Inbound Optimization

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htoerbio.htm

OSPF IPv6 (OSPFv3) IPSec ESP Encryption and Authentication

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_ospf3.htm

P2P Application Inspection and Control—Phase 1

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htzonebp.htm

Rate-Limiting Inspected Traffic

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htzonebp.htm

RFC 30 MFR MIB Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/mfr_mib.htm

SCCP Controlled Analog (FXS) Ports with Supplementary Features in Integrated Services Routers and VG224 Voice Gateways for Cisco IOS Software

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht1vg224.htm

SCCP PLAR with DTMF Out Pulse Digits for FXS Analog Phones

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/ht3vg224.html

Secure Communication Between IP-STE Endpoint and Line-Side STE Endpoint

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htv1501.htm

SIP: SIP Gateway OOB DTMF Support with KPML

For detailed information about this feature, see the "Configuring SIP DTMF Features" in the *Cisco IOS SIP Configuration Guide*.

SIP: SIP Gateway Session Timer Support

For detailed information about this feature, see "Configuring SIP Message, Timer, and Response Features" in the *Cisco IOS SIP Configuration Guide*.

SIP: SIP Gateway Support for SDP Session Info and Permit Hostname CLI

For detailed information about this feature, see the following:

"Configuring SIP Message, Timer, and Response Features" in the *Cisco IOS SIP Configuration Guide*.

SIP to SIP Supplementary Services for Session Border Controller (SBC)

For detailed information about this feature, see the *Cisco Unified Border Element Configuration Guide.*

Split DNS

For detailed information about these features, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t9/htspldns.htm

SSL VPN-WebVPN Enhancements

- WebVPN Auto Applet Download
- WebVPN NTLM Authentication
- WebVPN RADIUS Accounting

For detailed information about these features, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

Survivable Remote Site Telephony Version 4.0

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/vcallcon/ps2169/product_data_sheet0900aecd8042251f.html

Video Support for SCCP-Based Endpoints

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_configuration_guide_chapter09186a00806a8017.html

New Hardware Features Supported in Cisco IOS Release 12.4(6)T1

This section describes new and changed features in Cisco IOS Release 12.4(6)T1. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(6)T1. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- Port Adapter Jacket Card

Port Adapter Jacket Card

The Port Adapter Jacket Card addresses the demand for additional slot density and flexibility on the Cisco 7200VXR Services Aggregation Series by enabling the I/O controller card slot to hold a single (selected) port/service adapter for additional capacity on systems with the Cisco 7200VXR Series NPE-G1 Network Processing Engine and above.

Benefits of the Port Adapter Jacket Card include the following:

- Provides one additional slot for single port/service adapter (selected port/service adapters)
- Allows a high-bandwidth port adapter—such as the hardware based security encryption module SA-VAM2+ and the 2-Port Packet/SONET OC3c/STM1 Port Adapter—to be moved onto a dedicated Peripheral Component Interconnect (PCI) bus that the Cisco NPE-G1 or NPE-G2 provides
- Reduces PCI contention among other port adapters
- Provides a cost-effective way to increase the slot density in parallel to the increased switching capacity of the newest engine for the Cisco 7200VXR series—the Cisco NPE-G2

The port/service port adapters which are supported on the Port Adapter Jacket card are:

- Cisco VPN Acceleration Module 2 (part number: SA-VAM2); Supported only in combination with NPE-G1
- VPN Acceleration Module 2+ with AES wide key crypto card (part number: SA-VAM2+)

- 2-Port Packet/SONET OC3c/STM1 Port Adapter (part number: PA-POS-2OC3)
- 2-Port T3 Serial Port Adapter Enhanced (part number: PA-MC-2T3+)
- 1-Port multichannel STM-1 multi- and single mode port adapter (part numbers: PA-MC-STM-1MM, PA-MC-STM-1SMI)

For more information, please refer to the Port Adapter Jacket Card Data Sheet:

http://www.cisco.com/en/US/products/hw/routers/ps341/products_data_sheet0900aecd804419c6.html

New Software Features Supported in Cisco IOS Release 12.4(6)T1

This section describes new and changed features in Cisco IOS Release 12.4(6)T1. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(6)T1. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Port Adapter Jacket Card

Port Adapter Jacket Card

The Port Adapter Jacket Card is a wide-width carrier card that fits into the I/O slot of the Cisco 7200 VXR chassis that can hold a single port adapter. The PA utilizes the I/O slot, made possible by using NPE-G1 or NPE-G2 in a Cisco 7200 VXR chassis, for a high-speed port adapter or a hardware acceleration module that requires high bandwidth-points, such as SA-VAM2+.

New Hardware Features Supported in Cisco IOS Release 12.4(6)T

This section describes new and changed features in Cisco IOS Release 12.4(6)T. Some features may be new to Cisco IOS Release 12.4(6)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(6)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed is available in the following feature description.

- ADSL HWICs with ISDN Backup Ports
- Group Domain of Interpretation (GDOI) on VAM2+
- IPv6 IPSec on VAM2+
- MGX-RJ45-5ETH
- WLAN Controller Network Module

ADSL HWICs with ISDN Backup Ports

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/dsl_hwic.htm

Group Domain of Interpretation (GDOI) on VAM2+

The Group Domain of Interpretation (GDOI) feature installs support for GDOI on the VAM2+ hardware crypto engine. GDOI distributes keys and policy for groups, rekeys the group, and ejects a group member, as needed.

IPv6 IPSec on VAM2+

The IPv6 IPSec on VAM2+ feature installs support for IPSec encapsulated IPv6 packets on the VAM2+ hardware crypto engine. Basic IPv6 IPSec functionality interacts with Native IPv6 IPSec. Benefits include a higher number of tunnels and higher throughput relative to the software crypto engine.

MGX-RJ45-5ETH

The MGX-RJ45-5ETH is a single-height back card for the Route Processor Module (RPM)-PR that provides five RJ-45 connectors for Gigabit Ethernet, Fast Ethernet, or Ethernet lines.

WLAN Controller Network Module

For detailed information about this feature, see *Cisco Network Modules Hardware Installation Guide*.

New Software Features Supported in Cisco IOS Release 12.4(6)T

This section describes new and changed features in Cisco IOS Release 12.4(6)T. Some features may be new to Cisco IOS Release 12.4(6)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(6)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed is available in the following feature description.

- ACL Manageability
- ANI Suppression During L2TP Setup
- ATM Oversubscription for DSL
- Busyout Monitor Gatekeeper
- Certificate- Complete Chain Validation
- Cisco IOS 802.1x Supplicant Support
- Cisco IOS Firewall MIB
- Cisco Modem Relay
- Cisco Text Relay for Baudot Text Phones
- Configuring EIGRP for IPv6
- Configuring GLBP for IPv6
- Control Plane Logging
- DHCP Option 82 Per Interface Support
- DHCP Relay Accounting

- Dynamic Frequency Selection (DFS) and IEEE 802.11h Transmit Power Control
- EasyVPN Phase 7
- Expanded Consistent SNMP MIB Support for Modular Access Routers
- Fax-Relay Support for SG3 Fax Machines at G3 Speeds
- FHRP-HSRP Multiple Group Optimization
- In-Service Updates to Gatekeeper Zone Prefix Configuration
- Interface Input Queue Unwedging
- IOS Firewall Stateful Failover
- IP SLAs ICMP Jitter Operation
- IP SLAs—LSP Health Monitor
- IPv6 Switching Provider Edge Router over MPLS (6PE)
- Management Plane Protection
- MGCP NAS Package LAPB-TA
- MPLS Embedded Management—LSP Ping/Traceroute for LDP
- MSCHAP Version 2
- NAT—ARP Ping
- NAT—SCCP Fragmentation Support
- NAT TCP Based DNS Query Support
- Network Admission Control: Agentless Host Support
- OCSP—Server Certification from Alternate Hierarchy
- OER Voice Traffic Optimization
- OSPF Enhanced Traffic Statistics for OSPFv2 and OSPFv3
- OSPF RFC 3623 Graceful Restart Helper Mode
- OSPF: SNMP ifIndex Value for Interface ID in OSPFv2 and OSPFv3 Data Fields
- Packet Mode Services on D Channel
- Private VLAN Edge
- Remote Monitoring MIB Update
- RIPv2: RFC 1724 MIB Extension
- RSVP Application ID Support
- SCCP PLAR with DTMF Out Pulse Digits for FXS Analog Phones
- SDP Expanded Template CGI Support
- Shortcut Switching Enhancements for NHRP in DMVPN Networks
- SIP: Busy Out Support
- SIP: Cisco IOS SIP Gateway Signaling Support Over TLS Transport
- SIP-to-SIP Extended Feature Functionality for Session Border Controller
- SSHv2 for RPM-XF
- Tag and Template
- Threat Information Distribution Protocol

- TIDP Based Mitigation Services
- Unique Calling Party Information with Alternate Endpoints
- VPN Access Control Using 802.1X Authentication
- WebVPN Enhancements
- Zone-Based Policy Firewall

ACL Manageability

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/acldoc.htm

ANI Suppression During L2TP Setup

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htanisup.htm

ATM Oversubscription for DSL

ATM Oversubscription for DSL The ATM Oversubscription for DSL feature lets you use the new **atm oversubscribe factor** command to configure oversubscription on Cisco xDSL interfaces up to a defined bandwidth. You can configure variable bit rate (VBR) and unspecified bit rate plus (UBR+) service classes for permanent virtual circuit (PVC) connections with a sum of sustainable cell rates (SCRs) greater than the line rate, which means you can configure an infinite oversubscription amount of bandwidth. Each PVC receives up to its configured SCR value of traffic, and PVCs with higher SCR values receive more bandwidth. For detailed information about this feature, see the **atm oversubscribe factor** command reference page:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcr/tatm_r/atm_a1ht.htm

Busyout Monitor Gatekeeper

For detailed information about this feature, see the Trunk-Management Features document.

Certificate- Complete Chain Validation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/t6_cc.htm

Cisco IOS 802.1x Supplicant Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123limit/123x/123xa/gt_802_1.htm

Cisco IOS Firewall MIB

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_fwmib.htm

Cisco Modem Relay

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/mdmrly.htm

Cisco Text Relay for Baudot Text Phones

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/txtrly.htm

Configuring EIGRP for IPv6

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/v6eigrp.htm

Configuring GLBP for IPv6

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-fhrp.html

Control Plane Logging

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_cpl.htm

DHCP Option 82 Per Interface Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htdhopt8.htm

DHCP Relay Accounting

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htrelaya.htm

Dynamic Frequency Selection (DFS) and IEEE 802.11h Transmit Power Control

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_dfs.htm

EasyVPN Phase 7

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm

Expanded Consistent SNMP MIB Support for Modular Access Routers

This release provides additional network monitoring capabilities for Modular Access Routers, including the Cisco 2600XM, Cisco 2691, the Cisco 2800, 3700, and 3800 series, the Cisco IAD2400 series, and the Cisco VG224.

Software images for these platforms now support the following MIBs:

- CISCO-AAA-SERVER-MIB
- CISCO-ENTITY-FRU-CONTROL-MIB
- CISCO-ENHANCED-MEMPOOL-MIB
- CISCO-IP-STAT-MIB

Full details on these MIBs, including changes, dependencies, and full MIB text, can be obtained using the Cisco MIB Locator tool at http://www.cisco.com/go/mibs/.

Fax-Relay Support for SG3 Fax Machines at G3 Speeds

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/sg3spoof.htm

FHRP-HSRP Multiple Group Optimization

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_hsrpo.htm

In-Service Updates to Gatekeeper Zone Prefix Configuration

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ipip_zon.htm

Interface Input Queue Unwedging

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_6105.htm

IOS Firewall Stateful Failover

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_sfo.htm

IP SLAs ICMP Jitter Operation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/hticmpjt.htm

IP SLAs—LSP Health Monitor

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_hmon.htm

IPv6 Switching Provider Edge Router over MPLS (6PE)

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mpls6.htm

Management Plane Protection

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htsecmpp.htm

MGCP NAS Package LAPB-TA

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123limit/123y/123yb7/gtnaspkg.htm

MPLS Embedded Management—LSP Ping/Traceroute for LDP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_lspng.htm

MSCHAP Version 2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/hmschap.htm

NAT—ARP Ping

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htarping.htm

NAT—SCCP Fragmentation Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htntsccp.htm

NAT TCP Based DNS Query Support

The NAT TCP Based DNS Query Support feature enables NAT to distinguish a Domain Name System (DNS) query based on TCP or UDP and translate both of them without user CLI. In the past only UDP based DNS queries were supported. This feature does not support DNS zone transfers.

Network Admission Control: Agentless Host Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_nrhs.htm

OCSP—Server Certification from Alternate Hierarchy

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/t6_oscp.htm

OER Voice Traffic Optimization

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htoervto.htm

OSPF Enhanced Traffic Statistics for OSPFv2 and OSPFv3

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htostats.htm

OSPF RFC 3623 Graceful Restart Helper Mode

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htgrhelp.htm

OSPF: SNMP ifIndex Value for Interface ID in OSPFv2 and OSPFv3 Data Fields

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_ifndx.htm

Packet Mode Services on D Channel

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htnttx25.htm

Private VLAN Edge

The PVLAN edge (protected port) is a feature that has only local significance to the switch (unlike private VLANs), and there is no isolation provided between two protected ports located on different switches. A protected port does not forward any traffic to any other port that is also protected in the same switch. Traffic cannot be forwarded between protected ports at Layer 2. All traffic passing between protected ports must be forwarded through a Layer 3 device.

Remote Monitoring MIB Update

The Remote Monitoring MIB Update feature is now supported on the Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM and Cisco 2691 platforms.

RIPv2: RFC 1724 MIB Extension

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htripmib.htm

RSVP Application ID Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_appid.htm

SCCP PLAR with DTMF Out Pulse Digits for FXS Analog Phones

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht3vg224.htm

SDP Expanded Template CGI Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/t6_sdp.htm

Shortcut Switching Enhancements for NHRP in DMVPN Networks

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_nhrp.htm

SIP: Busy Out Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/featbos.htm#wp1050434

SIP: Cisco IOS SIP Gateway Signaling Support Over TLS Transport

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/feattls.htm

SIP-to-SIP Extended Feature Functionality for Session Border Controller

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ipip_sef.htm

SSHv2 for RPM-XF

Secure Shell (SSH) is an application and a protocol that provides a secure replacement to the Berkeley r-tools. The application is similar to the Berkeley rexec and rsh tools. The protocol secures the sessions by using standard cryptographic mechanisms. Two versions of SSH are available: SSH Version 1 and SSH Version 2. Cisco IOS Release 12.4(6)T implements SSH server and client for both versions. You must have the RPM-XF crypto image installed to use the SSH feature.

The SSH feature on the RPM-XF is useful if you want to manage the card through its management or high-speed back card. More often however, you manage the RPM-XF, and all other cards in the MGX chassis, from the PXM45 controller. The PXM45 controller also implements SSH and provides the same level of security.

If you plan to use SSH on the RPM-XF, consider disabling Telnet access to improve security. Telnet transfers all user ID, password, and session management information between the client and the RPM-XF by using clear text. Clear, or unencrypted text can be read by network analysis and snooping tools.

To use SSH the first time, you must activate the SSH server. You can then enable or disable SSH, or other management protocols, on the asynchronous (vty) ports. You enable the SSH server and configure SSH ports on the RPM-XF as you would other Cisco routers running Cisco IOS Release 12.4(6)T.

Tag and Template

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/ht_tandt.htm

Threat Information Distribution Protocol

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_thrt_info_dist.html

TIDP Based Mitigation Services

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_tidp_mitig_svcs.html

Unique Calling Party Information with Alternate Endpoints

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/ipip_ani.html

VPN Access Control Using 802.1X Authentication

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123limit/123x/123xa/gt_802_1.htm

WebVPN Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htwebvpn.htm

Zone-Based Policy Firewall

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t6/htzonebp.htm

New Software Features Supported in Cisco IOS Release 12.4(4)T3

This section describes new and changed features in Cisco IOS Release 12.4(4)T3. Some features may be new to Cisco IOS Release 12.4T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(4)T3. To determine if a feature is new or changed, see the feature history table at the beginning of the feature module for that feature. Links to feature modules are included below. If a feature listed below does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the feature description provided below.

- Cisco NM-1A-OC3-POM Network Module

Cisco NM-1A-OC3-POM Network Module

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124_x/atm_oc3.htm

New Hardware Features Supported in Cisco IOS Release 12.4(4)T

This section describes new and changed features in Cisco IOS Release 12.4(4)T. Some features may be new to Cisco IOS Release 12.4(4)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(4)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature

listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

ADSL HWICs

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/dsl_hwic.htm

Cisco 1801, Cisco 1802, and Cisco 1803 Routers

Cisco IOS Release 12.4(4)T introduces and supports the Cisco 1801, Cisco 1802, and Cisco 1803 wireless and non-wireless platforms.

Cisco 1801 Routers

The Cisco 1801 router has the following hardware components:

- One Fast Ethernet port
- One ADSL over POTS port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1801W Routers

The Cisco 1801W router has the following hardware components:

- One Fast Ethernet port
- One ADSL over POTS port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports
- IEEE 802.11a and 802.11b/g wireless

Cisco 1802 Routers

The Cisco 1802 router has the following hardware components:

- One Fast Ethernet port
- One ADSL over ISDN port

- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1802W Routers

The Cisco 1802W router has the following hardware components:

- One Fast Ethernet port
- One ADSL over ISDN port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports
- IEEE 802.11a and 802.11b/g wireless

Cisco 1803 Routers

The Cisco 1803 router has the following hardware components:

- One Fast Ethernet port
- One G.SHDSL port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1803W Routers

The Cisco 1803W router has the following hardware components:

- One Fast Ethernet port
- One G.SHDSL port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports
- IEEE 802.11a and 802.11b/g wireless

New Software Features Supported in Cisco IOS Release 12.4(4)T

This section describes new and changed features in Cisco IOS Release 12.4(4)T. Some features may be new to Cisco IOS Release 12.4(4)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(4)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- AAA-SERVER-MIB Set Operation
- Always On Dynamic ISDN (AO/DI) Enhancements
- Application Firewall—Instant Message Traffic Enforcement
- AS5xx0 Lawful Intercept (LI) Using Service Independent Intercept (SII) Architecture

- Basic MPLS Forwarding and Signaling
- BGP Route-Map Continue Support for Outbound Policy
- BGP Selective Address Tracking
- Bidirectional Forwarding Detection
- Cisco CallManager Express 3.4
- Cisco CMM Support for Cisco IOS Tcl IVR and VoiceXML
- Cisco IOS Certificate Server (CS) Split Database
- Cisco Unified CallManager T1 CAS Hookflash Transfer Support
- Cisco Modem Relay
- Cisco Survivable Remote Site Telephony (SRST) 3.4
- CNS Enhanced Results Message
- Configurable Domain Name Prefix/Suffix Stripping
- Configuration Management Enhancements
- Control Plane Protection
- DSP Operational State Notifications
- Dynamic Control of Gatekeeper Sequential LRQ Processing Through Gatekeeper Transaction Message Protocol (GKTMP) /GK API
- Easy VPN Phase 6
- Enhancing CISCO-H225-MIB with Disconnect Cause Codes
- Expanded Consistent SNMP MIB Support for Modular Access Routers
- Fax Relay Support for SG3 Fax Machines at G3 Speeds
- Flexible Packet Matching
- Gigabit EtherChannel
- HSRP Support for IPv6
- Identify Alternate Endpoint Call Attempts in RADIUS Call Accounting Records
- Interoperability Enhancements to the Cisco Multiservice IP-IP Gateway
- Intrusion Prevention System (IPS)—Cisco Incident Control Service
- IP SLAs RTP Based VoIP Operation
- IPsec and IKE MIB Support for Cisco VRF-Aware IPsec
- IPv6 IPsec Router-to-Router Tunnels
- L2TP Tunnel Selection Load Balancing with Random Algorithm
- MGCP Call Centric Debug
- MGCP CAS MD Package
- MGCP Endpoint Range Support
- MPF for Broadband LAC, LNS, and PTA
- Multicast User Authentication and Profile Support
- NetFlow Dynamic Top Talkers CLI
- NetfFlow Reliable Export with SCTP

- Optional OCSP Nonce
- PPPoE Circuit-ID Tag Processing
- QoS: CBQoSMIB Index Enhancements
- QoS: DirectConnect PDLM
- QoS: Skype Classification
- Real-time Call Type Reporting Through Gatekeeper Transaction Message Protocol (GKTMP)
- Routed Bridge Encapsulation with ATM Virtual Circuit Bundles
- Scalability for Stateful NAT
- Secure Device Provisioning (SDP) Start Page
- Secure Communication Between IP-STE Endpoint and Lineside STE Endpoint
- SIP: CLI for Caller ID When Privacy Exists
- SIP-to-SIP Basic Functionality for IP-to-IP Gateway
- SNMP MIB Support for Cisco CME and SRST
- SP Voice Operations Support Features
- Subordinate/RA Mode IOS Certificate Server (CS) Rollover
- Survivable Remote Site Telephony (SRST) Version 3.4
- SYSLOG over IPv6
- USB Storage PKI Enhancements
- VRF-Aware DNS
- X.25 Throughput Negotiation

AAA-SERVER-MIB Set Operation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htcaaasm.htm

Always On Dynamic ISDN (AO/DI) Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_aox25.htm

Application Firewall—Instant Message Traffic Enforcement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_fw_im.htm

AS5xx0 Lawful Intercept (LI) Using Service Independent Intercept (SII) Architecture

Lawful Intercept provides support for voice and dial calls on Cisco AS5400, Cisco AS5350, Cisco AS5400XM and Cisco AS5350XM platforms and Lawful Intercept support for voice calls on Cisco AS5850 using Cisco Service Independent Intercept (SII) architecture.

Basic MPLS Forwarding and Signaling

The Basic Multiprotocol Label Switching (MPLS) Forwarding and Signaling feature allows service providers to manually provision their MPLS networks, potentially increasing security and determinism throughout the network. The feature is similar in high-level concept to Static IP Routes currently available in Cisco IOS software. Functions include the following:

- Label Switching (Swap). Label Stacking: Must support a label stack five deep to enable technologies, such as MPLS VPN, MPLS Traffic Engineering, and Fast Reroute.
- MPLS Explicit Null Label
- MPLS Implicit Null Label
- Penultimate Hop Popping
- Label Merging
- LSP Stitching: Provides a mechanism to connect two different Label Switched Path (LSPs), each in different traffic engineering domains, into a functionally single end-to-end LSP

BGP Route-Map Continue Support for Outbound Policy

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/t_bgprco.htm

BGP Selective Address Tracking

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_bgpsn.htm

Bidirectional Forwarding Detection

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122sx/12218sxe/fs_bfd.htm

Cisco CallManager Express 3.4

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/products/sw/voicesw/ps4625/products_configuration_guide_book09186a008052da6b.html

Cisco CMM Support for Cisco IOS Tcl IVR and VoiceXML

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123limit/123x/123xy8/gtcmm.htm

Cisco IOS Certificate Server (CS) Split Database

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/s_pkisdb.htm

Cisco Modem Relay

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/mdmrly.htm

Cisco Survivable Remote Site Telephony (SRST) 3.4

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/voice/srst/srst34/index.htm

Cisco Unified CallManager T1 CAS Hookflash Transfer Support

Support for the Cisco Unified CallManager T1 CAS Hookflash Transfer Support feature is now available on Cisco 2600XM, Cisco 2691, Cisco 2800 series, Cisco 3600 series, Cisco 3700 series, and Cisco 3800 series platforms. For more information, refer to:

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/admin/4_2_3/ccmsys/a08gw.html#wp1125752

CNS Enhanced Results Message

The CNS Enhanced Results Message feature enables a Cisco Networking Services (CNS) Configuration Agent in Cisco IOS to generate enhanced result messages to the external management applications. The **cns config partial** command starts the Cisco Networking Services (CNS) configuration agent and accepts a partial configuration. The CNS Enhanced Results Message sends an enhanced message to the subject "cisco.cns.config.results." This message contains both overall and line-by-line information about the configuration that was sent and the result of the action requested in the original message. For more information about this feature, see the **cns config partial** command reference page.

Configurable Domain Name Prefix/Suffix Stripping

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htdomstr.htm

Configuration Management Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm

Control Plane Protection

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htcpp.htm

DSP Operational State Notifications

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/nmht_dsp.htm

Dynamic Control of Gatekeeper Sequential LRQ Processing Through Gatekeeper Transaction Message Protocol (GKTMP) /GK API

For detailed information about this feature, the *Cisco Unified Border Element Configuration Guide*.

Easy VPN Phase 6

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_7/ftezvpnr.htm

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm

Enhancing CISCO-H225-MIB with Disconnect Cause Codes

The CISCO-H225-MIB was enhanced with the Q.931 disconnect cause codes that the H.323 subsystem can receive. A disconnect can originate from the far-end gateway or from the opposite call leg on the local gateway. This enhancement to the MIB allows you to report disconnect cause code information, including the cause code type and the number of cause code disconnects received from either H.323 peer. The enhancement corresponds to the usage of the **show h323 gateway** command. See the **show h323 gateway** command for an example of the disconnect cause code display.

The Enhancing CISCO-H225-MIB with Disconnect Cause Codes feature provides SNMP MIB enhancements on the following platforms:

- Cisco AS5350 series universal gateways
- Cisco AS5400 series universal gateways
- Cisco AS5850 universal gateways

The MIB contains objects that represent active H.323 calls and also includes call details. For definitions of the H.323 MIB objects, see the following MIBs:

- CISCO-H225-MIB

To locate and download MIBs, use the Cisco MIB Locator found at the following URL:

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

Expanded Consistent SNMP MIB Support for Modular Access Routers

This release provides additional network monitoring capabilities for Modular Access Routers, including the Cisco 2600XM, Cisco 2691, Cisco 2800, Cisco 3700 family, and Cisco 3800 series platforms, plus the Cisco IAD2430, Cisco IAD2431, Cisco IAD2432, and Cisco VG224.

Software images for these platforms now support the following MIBs:

- CISCO-ENTITY-ASSET-MIB
- CISCO-ENTITY-FRU-CONTROL-MIB
- CISCO-ENHANCED-MEMPOOL-MIB
- CISCO-BULK-FILE-MIB
- CISCO-FTP-CLIENT-MIB
- CISCO-CLASS-BASED-QOS-MIB
- CISCO-QUEUE-MIB
- CISCO-CAR-MIB
- CISCO-AAA-SERVER-MIB
- CISCO-IP-STAT-MIB

Additionally, support has been added for the sysORTable in the global SNMPv2 systemGroup object, and the CISCO-ENVMON-MIB (Environmental Monitoring MIB) has been enhanced. Full details on these MIBs, including changes, dependencies, and full MIB text, can be obtained by using the Cisco MIB Locator tool at http://www.cisco.com/go/mibs/. (CSCee13618)

Fax Relay Support for SG3 Fax Machines at G3 Speeds

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/sg3spoof.htm

Flexible Packet Matching

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_fpm.htm

Gigabit EtherChannel

Gigabit EtherChannel (GEC) allows gigabit per second transmission rates and provides flexible, scalable bandwidth with resiliency and load sharing across links for switches, router interfaces, and servers. GEC combines multiple physical Gigabit Ethernet links into one channel, which manages load sharing of traffic among the links in the channel as well as redundancy if one or more links in the channel should fail; Unicast, broadcast, and multicast traffic is distributed across the links, providing higher performance and redundant parallel paths. If a link fails, traffic is redirected to remaining links within the EtherChannel without user intervention.

Based on the functionality, the GEC is the same as the Fast EtherChannel (FEC) except for the following:

- The interfaces added to the channel are Gigabit Ethernet interfaces.
- Because the onboard Gigabit Ethernet supports jumbo frames, there is a difference in the range of the MTU supported.

On the Cisco 7200, native (onboard) Gigabit Ethernet supports jumbo frames. The maximum transmission unit (MTU) supported on native Gigabit Ethernet ports is 9216. By default, the EtherChannel takes an MTU size in the range of 1500 to 10240 bytes. Once the first interface is added to the channel and an MTU is configured on it, the MTU range of the EtherChannel changes from its default value to the range supported by the first interface added to the channel.

HSRP Support for IPv6

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-fhrp.html

Identify Alternate Endpoint Call Attempts in RADIUS Call Accounting Records

For detailed information about this feature, see the *Cisco Unified Border Element Configuration Guide.*

Interoperability Enhancements to the Cisco Multiservice IP-IP Gateway

For detailed information about this feature, see the "Configuring Support for IP-to-IP Gateway and Gatekeeper Features on the Cisco 2801" chapter in the *Cisco CallManager and Cisco IOS Interoperability Guide*.

Intrusion Prevention System (IPS)—Cisco Incident Control Service

The Cisco IOS Intrusion Prevention System (IPS) helps protect a customer's network from internal and external attacks and threats. Cisco IOS IPS restructures and replaces the existing Cisco IOS Intrusion Detection System (IDS). For information about configuring IPS, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/tsec_c/tsec_ips.htm

IP SLAs RTP Based VoIP Operation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htrtpvip.htm

IPsec and IKE MIB Support for Cisco VRF-Aware IPsec

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_iimib.htm

IPv6 IPsec Router-to-Router Tunnels

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-fhrp.html

L2TP Tunnel Selection Load Balancing with Random Algorithm

The L2TP Tunnel Selection Load Balancing with Random Algorithm feature introduces an improved algorithm for load balancing Layer 2 Tunnel Protocol (L2TP) sessions when a network access server (NAS) must choose between multiple peer tunnel servers. For information about configuring L2TP load balancing, refer to the "Configuring L2TP Tunnel Server Load Balancing and Failover Using the RADIUS Tunnel Preference Attribute" section of the *Cisco IOS VPDN Configuration Guide*, Release 12.4T.

When multiple tunnel servers of the same priority are configured, the NAS will select the tunnel server with the lowest number of active sessions. If several tunnel servers have the same number of active sessions, the NAS must use a tie-breaking mechanism to determine which to select.

In Cisco IOS releases prior to 12.4(4)T, the NAS uses a round-robin selection as the tie-breaking mechanism. Because each NAS is aware only of its own session load, multiple NASs using the same round-robin algorithm may unevenly distribute sessions across the tunnel servers (session bunching). Each NAS selects the same tunnel server in the case of a tie because the round-robin tie-breaking mechanism always resolves to the same tunnel server. Session bunching is especially prominent when there is a very low number of sessions on each NAS.

Beginning in Cisco IOS Release 12.4(4)T, the NAS uses a new tie-breaking algorithm. A random selection is made among all peer tunnel servers carrying the same session load. This improved algorithm results in a more even distribution of sessions across tunnel servers, reducing the occurrence of session bunching.

MGCP Call Centric Debug

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/mgcpdbug.htm

MGCP CAS MD Package

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/mdpack.htm

MGCP Endpoint Range Support

Media Gateway Control Protocol (MGCP) Endpoint Range Support extends the **mgcp behavior** command by adding the **rsip-range** keyword. The **rsip-range** keyword controls whether the gateway can generate ReStart In Progress (RSIP) messages with endpoint ranges for versions other than Trunking Gateway Control Protocol (TGCP).

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123tcr/123tvr/index.htm

MPF for Broadband LAC, LNS, and PTA

Multi-Processor Forwarding (MPF) for Broadband L2TP Access Concentrator (LAC), L2TP Network Server (LNS), and PPP Termination and Aggregation (PTA) is a method of accelerating a subset of broadband aggregation features on the Cisco 7301 and Cisco 7200 VXR routers by enabling fast-forwarding software on the second CPU. MPF for Broadband LAC, LNS, and PTA significantly improves performance by at least two times that of a regular Cisco 7301 or Cisco 7200 VXR router without any hardware changes.

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123limit/123y/123ym14/mpf123ym.htm

Multicast User Authentication and Profile Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mcast.htm

Multi-PAD Support for X.25 connections

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/mltpd.htm

NetFlow Dynamic Top Talkers CLI

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/nfhtdant.htm

NetfFlow Reliable Export with SCTP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/nfhtsctp.htm

Optional OCSP Nonce

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/s_pkinon.htm

PPPoE Circuit-ID Tag Processing

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htecidtg.htm

QoS: CBQoSMIB Index Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/ht_cbqos.htm

QoS: DirectConnect PDLM

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121limit/121e/121e1/dtnbarad.htm

QoS: Skype Classification

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121limit/121e/121e1/dtnbarad.htm

Real-time Call Type Reporting Through Gatekeeper Transaction Message Protocol (GKTMP)

For detailed information about this feature, see the *Cisco Unified Border Element Configuration Guide*.

Routed Bridge Encapsulation with ATM Virtual Circuit Bundles

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htrbeatm.htm

Scalability for Stateful NAT

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124_x/snatsca.htm

Secure Device Provisioning (SDP) Start Page

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/s_pkisdp.htm

Secure Communication Between IP-STE Endpoint and Lineside STE Endpoint

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htv1501.htm

SIP: CLI for Caller ID When Privacy Exists

The SIP: CLI for Caller ID When Privacy Exists feature adds three command-line interface (CLI) options that make the handling of caller ID information more flexible. Specifically, the SIP: CLI for Caller ID When Privacy Exists feature addresses the following situations:

- Passing along caller ID information when privacy exists
- Handling the Display Name field when no display name exists
- Allowing caller ID information to be passed to ISDN as network-provided

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/feattp.htm

SIP-to-SIP Basic Functionality for IP-to-IP Gateway

For detailed information about this feature, see the *Cisco Unified Border Element Configuration Guide.*

SNMP MIB Support for Cisco CME and SRST

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/voice/its/cme34/cme34mib/index.htm

http://www.cisco.com/univercd/cc/td/doc/product/voice/srst/srst34/srst34mb/index.htm

SP Voice Operations Support Features

The Service Provider Voice Operations Support features, designed to enhance operations support of service provider networks, include the following:

- Per Call Debug Filter for H.323 Gatekeeper—This feature enables an advanced filtering mechanism on VoIP gatekeepers to selectively trace a particular call. For detailed information about this feature, see the "Filtering Troubleshooting Output" chapter in the *Cisco IOS Voice Troubleshooting and Monitoring Guide*.
- Internal Error Code (IEC)—A new IEC can be generated from the gatekeeper to improve tracking and diagnostics on networks. The new IEC identifies which entity on the network originated the error, the subsystem on that entity, and the actual error code within the subsystem. For detailed information about this feature, see the "Cisco VoIP Internal Error Codes" chapter in the *Cisco IOS Voice Troubleshooting and Monitoring Guide*.
- Media Inactive Call Detection (Silent Call Detection)—This feature enhances Cisco IOS behavior for disconnecting a call when an inactive condition is detected. The former behavior automatically disconnected inactive calls. Beginning in Release 12.4(4)T, this feature detects inactive (silent) H.323 or SIP call-legs on Cisco IOS-based gateways, and reports this situation to the Tcl IVR 2.0 application (which can disconnect the call). For detailed information about this feature, see the "Configuring Media Inactive Call Detection (Silent Call Detection)" chapter in the *Cisco IOS Tcl IVR and VoliceXML Application Guide,* Cisco IOS Release 12.3(14)T and later.
- Test Call—This feature enables a remote station or gateway to establish a call to any destination address from a Test Call station located at the network operating center and to audibly verify the voice path. For detailed information about this feature, see the "Troubleshooting H.323 Interfaces to the IP Network" chapter in the in the *Cisco IOS Voice Troubleshooting and Monitoring Guide*.

Subordinate/RA Mode IOS Certificate Server (CS) Rollover

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/s_pkirol.htm

Survivable Remote Site Telephony (SRST) Version 3.4

For detailed information about this feature, see the *Cisco IOS SIP SRST Version 3.4 System Administrator Guide*.

SYSLOG over IPv6

For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-fhrp.html

USB Storage PKI Enhancements

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/s_pkiusb.htm

VRF-Aware DNS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/htvrfdns.htm

X.25 Throughput Negotiation

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/thrunego.htm

New Hardware Features Supported in Cisco IOS Release 12.4(2)T

This section describes new and changed features in Cisco IOS Release 12.4(2)T. Some features may be new to Cisco IOS Release 12.4(2)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(2)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- Cisco 851, Cisco 857, Cisco 871, Cisco 876, Cisco 877, and Cisco 878 Routers
- Cisco 1811 and Cisco 1812 Integrated Services Routers
- Cisco High-Speed Intrachassis Module Interconnect (HIMI)
- Wireless Access Point High-Speed WAN Interface Card

Cisco 851, Cisco 857, Cisco 871, Cisco 876, Cisco 877, and Cisco 878 Routers

The Cisco 850 series integrated services routers are fixed-configuration routers that support broadband cable and ADSL over analog telephone line connections in small offices. The Cisco 870 Series of integrated services routers are fixed-configuration routers that support multiple types of DSL technologies, broadband cable, and Metropolitan (Metro) Ethernet connections in small offices.

Cisco IOS Release 12.4(2)T supports the following hardware features on the Cisco 850 and Cisco 870 series routers:

- High performance for broadband access in small offices
- 4-port 10/100 managed switch with VLAN support (does not include Cisco 850 series
- Secure WLAN 802.11b/g option with use of single, fixed antenna (850 series) or multiple antennas (870 series)
- Smart card token (E-Token) for device security using USB 2.0
- Power over Ethernet/Inline Power

Cisco 1811 and Cisco 1812 Integrated Services Routers

The Cisco 1811 and Cisco 1812 integrated services routers are fixed-configuration models designed for secure broadband, Metro Ethernet, and wireless connectivity. These integrated services routers reduce business costs by deploying a single device to provide multiple functions, such as integrated redundant link, routing, LAN switch, firewall, VPN, IPS, wireless LAN technology, and quality of service (QoS), which are typically performed by separate devices. The Cisco 1811 and Cisco 1812 also provide high-speed broadband and Ethernet access through two 10/100BASE-T WAN ports and also provide integrated WAN backup through a V.92 analog modem (Cisco 1811) or ISDN S/T BRI interface (Cisco1812).

The Cisco 1811 and Cisco 1812 routers also support the following features in Cisco IOS Release 12.4T:

- High performance for broadband access in small- to medium-sized offices
- 8-port 10/100 managed switch with VLAN support
- Secure WLAN 802.11a/b/g option with use for multiple antennae
- Smart card token (E-Token) for device security using USB 2.0
- Power over Ethernet/Inline Power

Cisco High-Speed Intrachassis Module Interconnect (HIMI)

The Cisco High-Speed Intrachassis Module Interconnect (HIMI) feature provides the capability to establish a connection between two Gigabit Ethernet (GE) enhanced network modules (ENMs) or an onboard small-form-factor pluggable (SFP) GE module and a GE ENM on Cisco 3825 and Cisco 3845 routers. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/serdesfm.htm

Wireless Access Point High-Speed WAN Interface Card

Cisco IOS Release 12.4(2)T includes support for the access point high-speed WAN interface card (AP HWIC). The AP HWIC is a single-wide interface card that houses one radio (single-mode) or two radios (dual-mode) for connection to a wireless LAN. This interface card operates as an access point when installed in a modular access router with AP HWIC support. Running the respective Cisco IOS software, which supports the AP HWIC (that is, all of the K9 images), provides high-speed connections between individual laptops, desktops, and servers. Features include VLAN support and enhanced wireless security.

The AP HWIC is offered in the following configurations:

- Single-mode AP carrier card with reverse-polarity threaded Neill-Concelman (RP-TNC) connectors dual antennas and a 2.4-GHz radio for 802.11b/g operations. The following are the Cisco part numbers and the geographic regions for which they are configured:
  - HWIC-AP-G-A—North America
  - HWIC-AP-G-E—Europe
  - HWIC-AP-G-J—Japan
- Dual-mode AP carrier card with RP-TNC dual antennas and two radios: one 2.4-GHz 802.11b/g radio and one 5 GHz 802.11a radio. The following are the Cisco part numbers and the geographic regions for which they are configured:
  - HWIC-AP-AG-A—North America
  - HWIC-AP-AG-E—Europe

- HWIC-AP-AG-J—Japan

Both the single-mode and dual-mode AP HWICs support diversity in the radio antennas. Types of antennas include swivel-mount dipole, wall-mount, and ceiling-mount antennas.

For more information about the AP HWIC, including installation information and information about supported antenna types, see the "Connecting Access Point High-Speed WAN Interface Cards to a Network" chapter in the *Cisco Interface Cards Hardware Installation Guide*.

New Software Features Supported in Cisco IOS Release 12.4(2)T

This section describes new and changed features in Cisco IOS Release 12.4(2)T. Some features may be new to Cisco IOS Release 12.4(2)T but were released in earlier Cisco IOS software releases. Some features may have been released in earlier Cisco IOS software releases and have been changed in Cisco IOS Release 12.4(2)T. To determine if a feature is new or changed, refer to the feature history table at the beginning of the feature module for that feature. Links to feature modules are included. If a feature listed does not have a link to a feature module, that feature is documented only in the release notes, and information about whether the feature is new or changed will be available in the following feature description.

- AAA CLI Stop Record Enhancement
- ACL Support for Filtering on TTL Value
- Active Probe Source Address
- AES and 3-DES Encryption Support for SNMPv3 Messages
- •BitTorrent PDLM Native Implementation
- Certificate Authority (CA) Key Rollover
- Certificate Storage Location Specification
- Circuit Emulation over IP
- Cisco Easy VPN Remote
- •Citrix ICA Published Applications Native Implementation
- Clear IP Traffic CLI
- Configuring the Exporting of Statistics from the NetFlow Main Cache
- Define Interface Policy-Map AV Pairs AAA
- E1 R2 Collect Call Blocking
- Easy VPN Server
- Embedded Event Manager 2.2
- FHRP—Enhanced Object Tracking Integration with Embedded Event Manager
- Flash Card Characterization
- HTTPS Support for Airlink Wireless Router
- ICMP Unreachable Rate Limiting User Feedback
- Inline Power Auto Negotiation
- IP SLAs IOS Packaging in IP Base
- IP SLAs Random Scheduler
- IPv6 ACL Extensions for Mobile IPv6

- IPv6 BSR—Ability to Configure RP Mapping
- IPv6 Default Router Preference
- IPv6 Source Specific Multicast (SSM) Mapping
- L2TP Calling Station ID Suppression
- Land Mobile Radio (LMR) over IP Enhancement
- MGCP Controlled Backhaul of BRI Signaling
- MLD Group Limits
- MQC Policy Map Support on Configured VC Range ATM
- MSDP MD5 Password Authentication
- Multilink Frame Relay (FRF.16.1) Variable Bandwidth Class Support
- •Multiple Matches Per Port
- NAT—Optimized SIP Media Path With SDP
- NAT—Optimized SIP Media Path Without SDP
- NetFlow Layer 2 and Security Monitoring Exports
- Network-Based Application Recognition
- OER Application-Aware Routing: PBR
- Process Interrupt Mask Profiler Enhancement
- RADIUS Logical Line ID
- RBE Client Side Encapsulation with QoS
- SCCP Analog (FXS) Ports
- Secure Communication Between IP-STE Endpoint and Trunkside STE Endpoint
- Single Source Infrastructure Phase IV
- SIP: Domain Name Support in SIP Headers
- SIP: Domain Name Support in SIP Headers
- SIP: Multilevel Precedence and Priority Support
- SIP Stack Portability
- SIP: User Agent MIB Enhancements
- SSG—Limiting the Number of Sessions and Services
- SSG Support of RADIUS Disconnect Message
- SSG Support of WISPr Location Attributes
- SSG Transient Stateful Host Object
- TCP Applications Flags Enhancement
- TCP Show Extension
- Transparent IPS
- Wireless LAN Enhancements
  - Broadcast Key Rotation
  - Cisco Compatible Extensions Information Element
  - Configurable Radio Transmit Power

  - IEEE 802.11 Wireless Standards Support
  - IEEE 802.11a Support
  - IEEE 802.11b Support
  - IEEE 802.11d World Mode Support
  - IEEE 802.11g Support
  - MAC Address Local Authentication
  - Multiple SSIDs
  - RADIUS Server per SSID
  - Transmit Power Control (TPC)
  - Wi-Fi Protected Access (WPA)
  - World Mode
- Zeroization

AAA CLI Stop Record Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t13/ftvrfaaa.htm

ACL Support for Filtering on TTL Value

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htacllttl.htm

Active Probe Source Address

The Active Probe Source Address feature allows you to configure a specific exit interface on the border router as the source for active probes. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/toer_c/index.htm

AES and 3-DES Encryption Support for SNMPv3 Messages

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/snmpv3ae.htm

Certificate Authority (CA) Key Rollover

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/st_pkien.htm

Certificate Storage Location Specification

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/st_pkist.htm

Circuit Emulation over IP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_7/bbfeamod.htm

Cisco Easy VPN Remote

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_7/ftezvpnr.htm

Clear IP Traffic CLI

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_clrip.htm

Configuring the Exporting of Statistics from the NetFlow Main Cache

Support for exporting the interface names from flows was added to the NetFlow data export feature by the addition of the **interface-names** keyword for the **ip flow-export** command. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/nfhtexps.htm

Define Interface Policy-Map AV Pairs AAA

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htipmaaa.htm

E1 R2 Collect Call Blocking

The E1 R2 Call Blocking feature provides two ways to block incoming collect calls: category-based and double answer. With category-based call blocking, collect calls are blocked based on a specific category. For example, in Brazil, collect calls arrive with a category II-8, for which the Cisco access router sends B-7 as a response instead of an answer signal. This approach is only applicable when switches in the central office support category-based blocking.

For legacy switches that do not support category-based blocking, the double answer method is implemented on the Cisco 2801 router to support the collect-call blocking. For an incoming collect call, the gateway answers the call with a clearback after one second and re-answers the call after two seconds, causing the collect call to be dropped and normal calls to stay connected. This can be implemented as a command-line interface (CLI) option for any country. See the **cas-custom** command at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124cr/hdia_r/dia_a1h.htm#wp1080542

For additional information, see the *Release Notes for Cisco 830 Series and Cisco 2801 Routers for Cisco IOS Release 12.3(11)YK1* at the following URL:

http://www.cisco.com/en/US/docs/ios/12_3/12_3y/release/notes/rn2800yk.html

Easy VPN Server

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t8/ftunity.htm

Embedded Event Manager 2.2

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_eem.htm

FHRP—Enhanced Object Tracking Integration with Embedded Event Manager

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/hteoteem.htm

Flash Card Characterization

The Flash Card Characterization feature determines a flash card's characteristics, including its timing parameters. This feature is useful in validating a new or existing flash card in a new platform. The Flash Card Characterization feature is also useful for troubleshooting a malfunctioning flash card and may help identify the root cause of the problem.

HTTPS Support for Airlink Wireless Router

The HTTPS Support for the Airlink Wireless Router feature enables the HTTP(S) infrastructure support for remote management of the Airlink Wireless Router. This feature provides configuration and status retrieval access to the Airlink Wireless Router for remote administrators and users.

ICMP Unreachable Rate Limiting User Feedback

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/hticmpun.htm

Inline Power Auto Negotiation

Inline Power Auto Negotiation is a Cisco IOS feature that allows automatic negotiation of inline power levels between Cisco routers or switches and Cisco powered devices. For the Inline Power Auto Negotiation feature to function, Cisco Discovery Protocol must be enabled on the router or switch and on the powered device. The Inline Power Auto Negotiation feature is enabled by default on hardware with inline power functionality but is not available for hardware without inline power functionality.

For the following hardware, inline power functionality is optional and must be installed for the inline Power Auto Negotiation feature to be available:

- EtherSwitch network modules on Cisco 2600, Cisco 3700, and Cisco 3800 series routers and on Cisco 2811, Cisco 2821, and Cisco 2851 routers
- 4-port and 9-port high-speed WAN interface cards configured on the Cisco 1841 and Cisco 2800 and Cisco 3800 integrated services routers

- Integrated switch ports on the Cisco 1800 series (fixed) (8 integrated switch ports) and Cisco 870 series (4 integrated switch ports) integrated services routers

IP SLAs IOS Packaging in IP Base

Cisco IOS IP service level agreements (SLAs) are a capability embedded in Cisco IOS software that allows Cisco customers to understand IP service levels, increase productivity, lower operational costs, and reduce the frequency of network outages. In Cisco IOS Release 12.4(2)T, the Cisco IOS IP SLAs Internet Control Message Protocol (ICMP) echo operation and the IP SLAs responder have been added to the IP base Cisco IOS packaging. All other Cisco IOS IP SLAs operations are not supported in the IP base feature set.

For information on IP SLAs configuration tasks, see the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4T. For information on IP SLAs commands, see the *Cisco IOS IP SLAs Command Reference*, Release 12.4.

IP SLAs Random Scheduler

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_slars.htm

IPv6 ACL Extensions for Mobile IPv6

Several ICMP message types have been defined to support Mobile IPv6. IPv6 access lists can be configured to allow IPv6 ACL entries matching Mobile-IPv6-specific ICMP messages to be configured and to allow the definition of entries to match packets containing Mobile IPv6 extension headers. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mobv6.htm

IPv6 BSR—Ability to Configure RP Mapping

This feature allows IPv6 multicast routers to be statically configured to announced scope-to-RP mappings directly from the BSR instead of learning them from candidate-RP messages. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mcast.htm

IPv6 Default Router Preference

The default router preference (DRP) extension in IPv6 provides a coarse preference metric (low, medium, or high) for default routers. For detailed information about this feature, see the following:

http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-fhrp.html

IPv6 Source Specific Multicast (SSM) Mapping

SSM mapping for IPv6 supports both static and dynamic Domain Name System (DNS) mapping for MLD version 1 receivers. This feature allows deployment of IPv6 SSM with hosts that are incapable of providing MLD version 2 support in their TCP/IP host stack and their IP multicast receiving application. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mcast.htm

L2TP Calling Station ID Suppression

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/clidsup.htm

Land Mobile Radio (LMR) over IP Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_7/lmrip/gtlmrip.htm

MGCP Controlled Backhaul of BRI Signaling

For detailed information about this feature, see ""Configuring MGCP-Controlled Backhaul of BRI Signaling in Conjunction with Cisco CallManager" chapter in the *Cisco CallManager and Cisco IOS Interoperability Guide*.

MLD Group Limits

MLD states that result from MLD version 2 or MLD version 1 membership reports can be limited globally or by interface. This feature provides protection against denial of service (DoS) attacks caused by MLD packets. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/ipv6_c/sa_mcast.htm

MQC Policy Map Support on Configured VC Range ATM

The MQC Policy Map Support on Configured VC Range ATM feature makes the **service-policy** command available in the PVC range subinterface configuration mode and in the PVC-in-range configuration mode.This feature adds support for MQC policy maps in conjunction with the ATM VC range functionality. This feature extends the functionality available for policy maps on a single ATM VC to the ATM VC range and simplifies the configuration process of ranges of ATM VCs.

MSDP MD5 Password Authentication

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htmsdpmd.htm

Multilink Frame Relay (FRF.16.1) Variable Bandwidth Class Support

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122s/122snwft/release/122s14/fs_mfr.htm

NAT—Optimized SIP Media Path With SDP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htsmpws.htm

NAT—Optimized SIP Media Path Without SDP

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htsmpwos.htm

NetFlow Layer 2 and Security Monitoring Exports

Support for capturing the value from the fragment offset field of IP headers was added to the NetFlow Layer 2 and Security Monitoring Exports feature by the addition of the **fragment-offset** keyword for the **ip flow-capture** command. For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/nfhtsecs.htm

Network-Based Application Recognition

The following features are supported in Cisco IOS Release 12.4(2)T:

- BitTorrent PDLM Native Implementation
- Citrix ICA Published Applications Native Implementation
- Multiple Matches Per Port

For detailed information about these features, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121limit/121e/121e1/dtnbarad.htm

Note NBAR is currently not supported with Stateful Switchover (SSO). This applies to the Cisco Catalyst 6500, Cisco 7600 and Cisco 7500 platforms.

OER Application-Aware Routing: PBR

The OER Application-Aware Routing: PBR feature introduces the capability to optimize outbound traffic for specific applications, port numbers, protocols, and other information in the IP packet header. This feature allows you to apply policy configuration independently for the specified application or traffic by matching specific information in the IP packet header without changing OER policy configuration that is applied to the prefix. Matched traffic is forwarded to a specific interface using policy-based routing (PBR).

Process Interrupt Mask Profiler Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/intrnask.htm

RADIUS Logical Line ID

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122t/122t13/ftlineid.htm

RBE Client Side Encapsulation with QoS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htrbeqos.htm

SCCP Analog (FXS) Ports

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht1vg224.htm

Secure Communication Between IP-STE Endpoint and Trunkside STE Endpoint

This feature supports encrypted and decrypted calls from IP secure terminal equipment (STE) controlled by Cisco CallManager through a voice gateway to an STE in the Defense Switching Network. This feature implements a subset of the V.150.1 modem relay standard, allowing users to operate U.S. Department of Defense-compliant (Type-1 encryption) devices across a VoIP network, and between VoIP networks and the Defense Switching Network.

Single Source Infrastructure Phase IV

The Single Source Infrastructure Phase IV feature incorporates infrastructure dependencies in order to enable the migration of the Enhanced Interior Gateway Routing Protocol (EIGRP) to a true single source component.

SIP: Domain Name Support in SIP Headers

The SIP: Domain Name Support in SIP Headers feature adds a command-line interface (CLI) switch to provide a host or domain name in the host portion of the locally generated session initiation protocol (SIP) headers (for example, From, RPID, and Call-ID). The SIP: Domain Name Support in SIP Headers feature also affects the outgoing dialog initiating SIP requests (for example, INVITE and SUBSCRIBE message requests).

SIP: Multilevel Precedence and Priority Support

The SIP: Multilevel Precedence and Priority Support feature enables Cisco IOS gateways to interoperate with other multilevel-precedence and preemption (MLPP)-capable circuit-switched networks.

An MLPP-enabled call has an associated priority level that applications that handle emergencies and congestions use to determine which lower-priority call to preempt in order to dedicate their end-system resources to high-priority communications. This feature addresses the aspect of preemption when interworking with defense-switched networks (DSNs) that are connected through the Cisco IOS gateway.

SIP Stack Portability

The SIP Stack Portability feature implements the following capabilities to the session initiation protocol (SIP) gateway Cisco IOS stack:

- It receives inbound REFER message requests both within a dialog and outside of an existing dialog from the user agents (UAs).
- It sends and receives SUBSCRIBE or NOTIFY message requests via UAs.
- It receives unsolicited NOFITY message requests without having to subscribe to the event that was generated by the NOTIFY message request.
- The portable stack supports outbound delayed media.

  It sends an INVITE message request without Session Definition Protocol (SDP) and provides SDP in either the PRACK or ACK message request for both initial call establishment and midcall re-INVITE message requests.
- It sets SIP headers and content body in requests and responses.

  The stack applies certain rules and restrictions for a subset of headers and for some content types (such as SDP) to protect the integrity of the stack's functionality and to maintain backward compatibility. When receiving SIP message requests, it reads the SIP header and any attached body without any restrictions.

SIP: User Agent MIB Enhancements

The SIP: User Agent MIB Enhancements feature provides SNMP MIB object enhancements to the CISCO-SIP-UA-MIB and informational updates to the CISCO-SIP-UA-CAPABILITY file. The CISCO-SIP-UA-CAPABILITY file provides information such as the Cisco IOS release number and the capabilities of the CISCO-SIP-UA-MIB. The SIP: User Agent MIB Enhancements feature is available on the following Cisco platforms:

- Cisco AS5350 universal gateways
- Cisco AS5400 series universal gateways
- Cisco AS5850 universal gateways
- Cisco CVA120 series cable voice adapters
- Cisco IAD2430 series integrated access devices
- Cisco uBR925 cable access routers
- Cisco 1750, Cisco 1751, Cisco 1760
- Cisco 1751-V
- Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
- Cisco 2801, Cisco 2811, Cisco 2851, Cisco 2821
- Cisco 3640, Cisco 3640A, Cisco 3660
- Cisco 3825, Cisco 3845
- Cisco 3725, Cisco 3745
- Cisco 7200 series

The SIP: User Agent MIB Enhancements feature provides SNMP MIB object configuration and counter support that are equivalent to command-line interface additions introduced in the following features:

- SIP Call Admission Control Support

- SIP Call Transfer Enhancements Using the Refer Method
- SIP Cisco IOS Gateway Reason Header and Buffered Calling Name Completion
- SIP: Gateway HTTP Authentication Digest
- SIP Gateway Support Enhancements to the bind Command
- SIP Header/URL Support and Subscribe/Notify for External Triggers
- SIP Hold Timer Support
- SIP ISDN Suspend/Resume Support
- SIP PSTN Transport Using Cisco's Generic Transparency Descriptor (GTD)
- SIP RFC 3261 Enhancements (RFC 3261)

In addition, the SIP: User Agent MIB Enhancements feature provides two new MIB objects. In Release 12.3(4)T, the SIP Gateway Support Enhancements to the bind Command feature extended the Cisco IOS **bind** command by adding the **media** keyword. The **media** keyword allows multiple instances of the **bind** command. One instance defines the control address, and one instance defines the media address. Because the original CISCO-SIP-UA-MIB was defined with a single instance of the **bind** command, the MIB objects that support the **bind** command will be replaced with two new MIB objects that support multiple instances.

Any SNMP applications that SET or GET the following objects from the CISCO-SIP-UA-MIB:

- cSipCfgBindSrcAddrScope
- cSipCfgBindSrcAddrInterface

need to refer to the new objects. Although these objects have not been removed and are still accessible with Release 12.4(2)T, they will be removed in a future release. Users must upgrade any affected application to the following new objects:

- cSipCfgBindSourceAddrScope. This object can have a value of either media (1) or control (2).
- cSipCfgBindSourceAddrInterface. This object can have any value of the integer interface index.

You can specify pairs of cSipCfgBindSourceAddrInterface and cSipCfgBindSourceAddrScope objects. Specifying pairs allows you to associate one interface address with control traffic and another interface address with media traffic.

Note "Src" in the prior objects has been replaced with "Source" in the new objects.

For full definitions of the SIP MIB objects, see the CISCO-SIP-UA-MIB. To locate and download MIBs, use Cisco MIB Locator found at the following URL:

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

SSG—Limiting the Number of Sessions and Services

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_maxcn.htm

SSG Support of RADIUS Disconnect Message

Service Selection Gateway (SSG) supports the RADIUS disconnect message, as specified in *RFC 3576—Dynamic Authorization Extensions to Remote Authentication Dial In User Service (RADIUS).* This message enables the billing server to request SSG to disconnect an active session.

When SSG receives a disconnect request with a RADIUS code of 40, it disconnects the user and deletes all information related to the host object. For Transparent Auto Logon (TAL) users, SSG deletes the Transparent pass-through (TP) entry. SSG identifies the host based on attribute 8 (framed-ip address) or the vendor-specific attribute (VSA) ssg account-info with subattribute S in the disconnect request. In host key overlap mode, the ssg account-info VSA is required to process the disconnect request. Inactive hosts will not be deleted.

For RADIUS proxy users, SSG deletes the host but does not forward the disconnect request to the downstream devices. The authentication, authorization, and accounting (AAA) RADIUS server forwards the disconnect request to the downstream devices, which removes all the session information.

SSG Support of WISPr Location Attributes

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_wispr.htm

SSG Transient Stateful Host Object

The Microsoft 2000 operating system performs a Dynamic Host Configuration Protocol (DHCP)-Renew when it receives an IP address. An Access Zone Router (AZR) interprets the DHCP-Renew action as a client disconnect. As a result, the AZR sends an Accounting-Stop message to the Service Selection Gateway (SSG) device. The SSG device deletes the host object and all its associated connections, including the ProxyLogonAttrs. When SSG subsequently receives an Accounting-Start message with an IP address, SSG does not have authenticated ProxyLogonAttrs for the WLAN user. SSG creates IPUserAttrs for this user and waits for the user to log in to the Subscriber Edge Services Module (SESM). However, in some situations, SESM does not exist; all services are auto-services. In such cases, the WLAN user cannot log in. Even if the user resets the wireless connection and reauthenticates, the user still cannot log in.

Cisco IOS Release 12.4(2)T introduces an enhancement that accommodates DHCP-Renew actions without causing a complete disconnect. When the SSG device receives an Accounting-Stop message, it retains the host object and puts it in an inactive state. The SSG device waits an amount of time for an Accounting-Start message with an IP address from the AZR. (The IP address timer specifies the amount of time to wait.) If the SSG device receives the Accounting-Start message from the AZR within the specified time, the SSG device activates the host object. If the SSG device does not receive the Accounting-Start message within the specified amount of time, it then deletes the host object. This enhancement improves the call flow between the AZR and the SSG device.

Note This enhancement does not apply to open authentication scenarios (no EAPSIM authentication). SSG deletes the host object when it receives an Accounting-Stop message from the AZR. The WLAN user can log back in to the SESM.

TCP Applications Flags Enhancement

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/ht_socop.htm

TCP Show Extension

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/htshwext.htm

Transparent IPS

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124cg/hsec_c/part15/sec_ips.htm

Wireless LAN Enhancements

Broadcast Key Rotation

The Broadcast Key Rotation feature allows users to set a timeout for the shared broadcast key, causing a new broadcast key to be generated.

Cisco Compatible Extensions Information Element

The Cisco Compatible Extensions Information Element feature allows a Cisco Aironet access point (AP) to inform Cisco Compatible Extensions client devices about the Cisco-compatible release version that it supports.

Configurable Radio Transmit Power

The Configurable Radio Transmit Power feature allows the user to set the transmit power of the access point, scaling the coverage area as needed:

- For 802.11g cck: 7 10 13 15 17 20 dBm
- For 802.11g ofdm: 7 10 13 15 17 dBm
- For 802.11a: 4 7 10 13 16 dBm

IEEE 802.11 Wireless Standards Support

The IEEE 802.11 Wireless Standards Support feature provides support for IEEE 802.11 standards for wireless networking.

IEEE 802.11a Support

The IEEE 802.11a Support feature provides support for IEEE 802.11a standards for wireless networking.

IEEE 802.11b Support

The IEEE 802.11b Support feature provides support for IEEE 802.11b standards for wireless networking.

IEEE 802.11d World Mode Support

The IEEE 802.11d World Mode Support feature provides support for the 802.11d standard for world mode, which enables the access point (AP) to inform 802.11 wireless clients which radio settings it should use to conform to local regulations.

IEEE 802.11g Support

The IEEE 802.11g Support feature provides support for IEEE 802.11g standards for wireless networking.

MAC Address Local Authentication

The MAC Address Local Authentication feature allows the Cisco access point (AP) local authenticator to be configured to allow MAC authentication of users on that AP.

Multiple SSIDs

With the Multiple SSIDs feature, the access point (AP) provides support for up to 16 SSIDs, enabling flexible service deployment.

RADIUS Server per SSID

The RADIUS Server per SSID feature allows RADIUS servers to be specified on a per-SSID basis.

Transmit Power Control (TPC)

The Transmit Power Control (TPC) feature provides support for Transmit Power Control (TPC) for Cisco access points (APs).

Wi-Fi Protected Access (WPA)

The Wi-Fi Protected Access (WPA) feature provides support for Wi-Fi Protected Access (WPA), which is the Wi-Fi alliance specification for interoperable wireless LAN security that supports IEEE 802.1x authentication and TKIP encryption.

World Mode

The world mode feature automates client configuration of channel and transmit power settings by allowing world-mode-enabled access points to configure the settings on world-mode-enabled clients.

For detailed information about these features, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124tcg/twlr_c/index.htm

Zeroization

For detailed information about this feature, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t2/zeroizat.htm

MIBs

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

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

Deprecated and Replacement MIBs

Old Cisco MIBs will be replaced in a future release. OLD-CISCO-* MIBs are being converted into more scalable MIBs without affecting existing Cisco IOS products or network management system (NMS) applications. You can update from deprecated MIBs to the replacement MIBs as shown in Table 13.

Table 13 Deprecated and Replacement MIBs

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	To be determined
OLD-CISCO-DECNET-MIB	To be determined
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-IP-MIB	To be determined
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-TS-MIB	To be determined
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	To be determined

Limitations and Restrictions

Limitations and Restrictions for Cisco IOS Release 12.4(20)T

The following sections contain limitations and restrictions that apply to Cisco IOS Release 12.4(20)T.

Cisco 3200 Router

Cisco IOS Release 12.4(15)XZ introduced CU-CME support on the Cisco 3230/3250 and Cisco 3270 router platforms. Due to memory size limitations on the Cisco 3230/3250 router card, CUCME feature enhancements will be limited to Cisco IOS Release 12.4(15)XZ and Cisco IOS Release 12.4(20)T. Customers that wish to activate CUCME on the Cisco 3230/3250 will need to use the Adventerprisek9 Cisco 3230/3250 image based off Cisco IOS Release 12.4(15)XZ.

The Cisco 3270 platform will continue to support additional CUCME feature enhancements beyond the Cisco IOS Release 12.4(15)XZ. Reference the CUCME technical guides for new feature support on the Cisco 3270 platforms in future CUCME releases.

Limitations and Restrictions for Cisco IOS Release 12.4T

The following sections contain limitations and restrictions that apply to Cisco IOS Release 12.4T.

802.1x Limitations

The Cisco ISR platforms (800, 1800, 2800) support most of the 802.1x features, but not all of the features are supported. For example, unidirectional 802.1x with the **dot1x control-direction** command is not supported on these platforms. This command is not supported in Cisco IOS Release 12.4T.

cTCP and VSA Restriction

Cisco Tunnel Control Protocol (cTCP) is not supported on VPN Services Adapter (VSA).

Cisco IOS Firewall Instant Messenger Support Restriction

Cisco IOS firewall supports only the following versions of each Instant Messenger (IM) application:

- Yahoo Messenger supported versions: 6.0.0.1922, 6.0.0.1750, 6.0.0.1671, and 6.0.0.1643
- MSN supported versions: 6.2.0205 and 7.0.0816
- AOL supported version: 5.9.3702

Note All other IM version connections will be reset.

SNMP Version 1 BGP4-MIB Limitations

You may notice incorrect BGP trap OID output when using the SNMP version 1 BGP4-MIB that is available for download at ftp://ftp.cisco.com/pub/mibs/v1/BGP4-MIB-V1SMI.my. When a router sends out BGP traps (notifications) about state changes on an SNMP version 1 monitored BGP peer, the enterprise OID is incorrectly displayed as .1.3.6.1.2.1.15 (bgp) instead of .1.3.6.1.2.1.15.7 (bgpTraps). The problem is not due to any error with Cisco IOS software. This problem occurs because the BGP4-MIB does not follow RFC 1908 rules regarding version 1 and version 2 trap compliance. This MIB is controlled by IANA under the guidance of the IETF, and work is in progress by the IETF to replace this MIB with a new version that represents the current state of the BGP protocol. In the meantime, we recommend that you use the SNMP version 2 BGP4-MIB or the CISCO-BGP4-MIB to avoid an incorrect trap OID.

Important Notes

The following sections contain important notes about Cisco IOS Release 12.4T.

Deferrals

Cisco IOS software images are subject to deferral. Cisco recommends that you view the deferral notices at the following location to determine if your software release is affected:

http://www.cisco.com/kobayashi/sw-center/sw-ios-advisories.shtml

Field Notices and Bulletins

- Field Notices—We recommend that you view the field notices for this release to see if your software or hardware platforms are affected. If you have an account with Cisco.com, you can find Field Notices at a http://www.cisco.com/kobayashi/support/tac/fn_index.html. If you do not have a Cisco.com login account, you can find field notices at http://www.cisco.com/public/support/tac/fn_index.html.
- Product Bulletins—You can find product bulletins at http://www.cisco.com/warp/public/cc/general/bulletin/iosw/index.shtml.
- *What's Hot in Software Center—What's Hot in Software Center* provides information about caveats that are related to deferred software images. If you have an account on Cisco.com, you can access *What's Hot for IOS Releases* at http://www.cisco.com/kobayashi/sw-center or by logging in and choosing **Technical Support > Software Center > Cisco IOS Software > What's Hot in Software Center**.
- *What's New for IOS—What's New for IOS* lists recently posted Cisco IOS software releases and software releases that have been removed from Cisco.com. If you have an account on Cisco.com, you can access *What's New for IOS* at http://www.cisco.com/public/sw-center/index.shtml or by logging into Cisco.com and choosing **Support > Download Software**.

Important Notes for Cisco IOS Release 12.4(24)T

The following information applies to all releases of Cisco IOS Release 12.4(24)T.

Cisco IOS Voice Command Reference

The **authenticate redirecting-number** command and **voice-class sip authenticate redirecting-number** command are added to the Cisco IOS Voice Command Reference. Use these commands to configure the number that dial peers on a Cisco IOS voice gateway use to authenticate and pass SIP credentials.

Old behavior: If these commands are not configured, all dial peers on the gateway authenticate and pass SIP credentials based always on the calling number.

New behavior: You can specify, for any or all dial peers on a Cisco IOS voice gateway, the number used to authenticate and pass SIP credentials. You can enable one or both of the authenticate redirecting-number commands to specify that one or more dial peers on the gateway authenticate and pass SIP credentials based on the redirecting number if available. When the redirecting number is not available, the calling number is used. (The redirecting number is available only in the headers of forwarded calls.)

For additional information, see the following: http://www.cisco.com/en/US/docs/ios/voice/sip/configuration/guide/sip_cg-call_x-fer.html#SIP_Call_Forwarding.

Important Notes for Cisco IOS Release 12.4(22)T

The following information applies to all releases of Cisco IOS Release 12.4(22)T.

Cisco IOS Firewall Configuration with WAAS and WCCP

The new configuration in Cisco IOS Releases 12.4(20)T and 12.4(22)T places the integrated-service-engine in its own zone and need not be part of any zone-pair. The zone-pairs are configured between zone-hr (zone-out) and zone-eng (zone-output).

For more information, see the following configuration example:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_zone_polcy_firew.html#wp1088645

Important Notes for Cisco IOS Release 12.4(20)T

The following information applies to all releases of Cisco IOS Release 12.4(20)T.

CEF Scalability and Selective Rewrite (CSSR) and MPLS Forwarding Infrastructure (MFI)

Cisco IOS Software Release 12.4(20)T incorporates an upgrade of the Cisco Express Forwarding (CEF) Switching Path and a new implementation of the MPLS Forwarding and Information Base (MFI).

Cisco Express Forwarding (CEF) technology for IP is a scalable, distributed, layer 3 switching solution designed to meet the performance requirements of the Internet and Enterprise networks. The CEF infrastructure has been adapted and rewritten as Cisco Express Forwarding Scalability and Selective Rewrite (CSSR) in order to meet the requirements and scalability of Internet traffic evolution as well as support new platforms and features developed by Cisco.

This infrastructure is also supported in Cisco IOS Software Releases 12.2SB, 12.2SE, 12.2SG, 12.2SR, and 12.2SX.

Benefits

CSSR delivers the following benefits:

- Enhances scalability to sustain the Internet growth, support larger numbers of:
  - IPv4/IPv6 prefixes and adjacencies
  - Load balanced paths
  - VPNs (VPN routing and forwarding instances
- Simplifies fast switching path decisions for both IPv4 and IPv6 traffic
- Offers improved manageability:
  - CEF logging for both IPv4 and IPv6
  - Unicast Reverse Path Forwarding (uRPF) Strict and Loose mode for both IPv4 and IPv6
  - CEF MIB support
  - uRPF MIB support
  - CLI display enhancements

Considerations

CSSR and MFI infrastructure enhancements in Cisco IOS Release 12.4(20)T might result in changed performance characteristics in your networks. Please test your configurations prior to upgrading to this software release.

Cisco 1861 Cable Modem Interface Number and MAC Address Change Between Images

Interface numbering for the cable modem on the Cisco 1861 router will change from 0/3/0 to 0/2/0 after upgrading from Cisco IOS Release 12.4(11)XW to Cisco IOS Release 12.4(20)T. When the numbering changes, the MAC address on the cable modem may also change. This will cause the cable modem interface to be in the shutdown state with no configuration after an image change.

Cisco IOS Firewall Configuration with WAAS and WCCP

The new configuration in Cisco IOS Releases 12.4(20)T and 12.4(22)T places the integrated-service-engine in its own zone and need not be part of any zone-pair. The zone-pairs are configured between zone-hr (zone-out) and zone-eng (zone-output).

For more information, see the following configuration example:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_zone_polcy_firew.html#wp1088645

Traffic and Configuration Situations Can Result in Reduced Capacity (CSCso48098, CSCsj71970)

For guidelines on managing traffic loads and features on this release, please contact your Cisco account team.

Important Notes for Cisco IOS Release 12.4(15)T9

The following information applies to all releases of Cisco IOS Release 12.4(15)T9.

PBR with Dynamic DHCP

When upgrading from Cisco IOS Release 12.4(15)T7 to Cisco IOS Release 12.4(15)T9, PBR with dynamic DHCP may not function correctly.

In Cisco IOS Release 12.4(15)T7, the following configuration works:

route-map *test* **permit** *10*

match ip address *xxxx*

set ip next-hop dynamic dhcp

However, after upgrading to Cisco IOS Release 12.4(15)T9, you will need to add these additional commands for the configuration to work:

track *100* **interface** *xx* **ip routing**

interface *xx*

ip dhcp client route track *100*

Important Notes for Cisco IOS Release 12.4(11)T

The following information applies to all releases of Cisco IOS Release 12.4(11)T.

BGP in IP Base

BGP is available in the "IP base" software package in Cisco IOS Release 12.4(11)T for Cisco 1841, Cisco 2800 family, and Cisco 3800 family routers.

Important Notes for Cisco IOS Release 12.4(9)T

The following information applies to all releases of Cisco IOS Release 12.4(9)T.

Cisco IOS NetFlow Top Talkers

The **show ip flow top** command introduced in 12.4(4)T as part of the NetFlow Dynamic Top Talkers CLI feature is now merged into the **show ip flow top-talkers** command. The **show ip flow top-talkers** command can now be used to display top talker traffic statistics for unaggregated top flows and aggregated top flows.

For detailed information about this modification, see the **show ip flow top-talkers** command in the following document:

http://www.cisco.com/en/US/docs/ios/netflow/command/reference/nf_02.html

Important Notes for Cisco IOS Release 12.4(6)T1

The following information applies to all releases of Cisco IOS Release 12.4(6)T1.

Japan 1812J Profiled Release

Cisco IOS Release 12.4(6)T1 is hardened by Japan Broadband WAN service emulated NSITE Next Generation Branch End-to-End System Test for Cisco 1812-J router. Cisco IOS Release 12.4(6)T1 and the following rebuild releases are classified as “Japan 1812J Profiled Release”.

The release has integrated major software defects captured by the testing activities and the service requests reported to Japan TAC.

Important Notes for Cisco IOS Release 12.4T

The following information applies to all releases of Cisco IOS Release 12.4T.

SYSLOG Enhancement for Airlink Phase-I (CSCsc55620)

Earlier the syslog messages were displayed as follows:

When associated:

```
Device Name, MAC Address, KEY-MGMT used
```

When disassociated:

```
Device Name, MAC Address, Reason
```

Now the syslog messages are displayed as follows:

When associated:

```
Device Name, MAC Address, SSID, AUTH-TYPE, KEY-MGMT.
```

When disassociated:

```
Device Name, Mac Address, Reason, SSID.
```

Caveats for Cisco IOS Release 12.4T

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. Severity 3 caveats are moderate caveats, and only select severity 3 caveats are included in the caveats document.

For information on caveats in Cisco IOS Release 12.4T, refer to the *Caveats for Cisco IOS Release 12.4T* document, which lists severity 1 and 2 caveats and select severity 3 caveats for Cisco IOS Release 12.4T and is located on Cisco.com.

Note If you have an account on 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 **Products and Services > Cisco IOS Software > Cisco IOS Software Releases 12.2 > Troubleshooting > Bug Toolkit**. Another option is to go to http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl. (If the defect that you have requested cannot be displayed, this may be due to one or more of the following reasons: the defect number does not exist, the defect does not have a customer-visible description yet, or the defect has been marked Cisco Confidential.)

Troubleshooting

The following documents provide assistance with troubleshooting your Cisco hardware and software:

- *Hardware Troubleshooting Index Page* at:

  http://www.cisco.com/en/US/products/hw/routers/ps214/products_tech_note09186a008012fb88.shtml

- *Troubleshooting Bus Error Crashes* at:

  http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_tech_note09186a00800cdd51.shtml

- *Why Does My Router Lose Its Configuration During Reboot?* at:

  http://www.cisco.com/en/US/products/hw/routers/ps233/products_tech_note09186a00800a65a5.shtml

- *Troubleshooting Router Hangs* at:

  http://www.cisco.com/en/US/products/hw/routers/ps359/products_tech_note09186a0080106fd7.shtml

- *Troubleshooting Memory Problems* at:

  http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_tech_note09186a00800a6f3a.shtml

- *Troubleshooting High CPU Utilization on Cisco Routers* at:

  http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a00800a70f2.shtml

- *Troubleshooting Router Crashes* at:

  http://www.cisco.com/en/US/products/hw/iad/ps397/products_tech_note09186a00800b4447.shtml

- *Using CAR During DOS Attacks* at:

  http://www.cisco.com/en/US/customer/products/sw/iosswrel/ps1835/products_tech_note09186a00800fb50a.shtml