



# Release Notes for the Cisco 10000 Series ESR for Cisco IOS Release 12.2(2)BY2

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**February 21, 2002**

These release notes provide information about Cisco IOS Release 12.2(2)BY2, which provides broadband aggregation features for the Cisco 10000 series edge services router (ESR). These release notes are identical to the release notes for Cisco IOS Release 12.2(2)BY1, but were updated to include fixes for caveats discovered and resolved since the release of Cisco IOS Release 12.2(2)BY1 (see the [“Resolved Problems in Cisco IOS Release 12.2\(2\)BY2”](#) section on page 10).

These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, and changes to the microcode and related documents.

Cisco IOS Release 12.2(2)BY2 is based on the following releases:

- Cisco IOS Release 12.2(2)BY1
- Cisco IOS Release 12.0(19)SL for features specific to the Cisco 10000 series ESR
- Cisco IOS Release 12.2B for platform-independent features

For a list of the software caveats that apply to Cisco IOS Release 12.2(2)BY2, see the [“Caveats in Cisco IOS Release 12.2\(2\)BY1”](#) section on page 11.

To review the release notes for Cisco IOS Release 12.0(19)SL, go to [www.cisco.com](http://www.cisco.com) and click **Technical Documents > Aggregation > Cisco 10000 Series Edge Services Routers > Cisco 10000 Series ESR Release Notes > Release Notes for the Cisco 10000 Series ESR for Cisco IOS Release 12.0(19)SL**.

To review the release notes for Cisco IOS Release 12.2, go to [www.cisco.com](http://www.cisco.com) and click **Technical Documents**. Select **Release 12.2** from the Cisco IOS Software drop-down menu. Then click **Cisco IOS Release Notes > Cisco IOS Release 12.2**.



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## Upgrading to a New Software Release

For specific information about upgrading your Cisco 10000 series ESR to a new software release, see the *Cisco 10000 Series ESR Software Configuration Guide*.

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

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

For additional information about ordering Cisco IOS software, refer to the Cisco IOS Software Releases URL:

<http://www.cisco.com/warp/public/cc/pd/iosw/iore/index.shtml>

## System Requirements

This broadband aggregation image requires that you have the PRE1 version (part number ESR-PRE1) of the Performance Routing Engine (PRE) installed in the Cisco 10000 series ESR chassis. You can verify which PRE is installed in the ESR by using the **show version** command.

## New Features in Cisco IOS Release 12.2(2)BY1

This release of Cisco IOS software brings broadband aggregation to the Cisco 10000 series ESR, and enables the router to emulate an L2TP Network Server (LNS)/home gateway upstream from a DSL access network. In this role, the ESR connects to an L2TP Access Concentrator (LAC), terminates the point-to-point protocol (PPP) layer, and assigns a network layer configuration to the remote client. The ESR then routes or forwards the remote client data to the backbone network.

The following new features and improvements are supported in Cisco IOS Release 12.2(2)BY1 to provide broadband aggregation. If you need more information on configuring these features, see the *Cisco IOS Wide-Area Networking Configuration Guide, Release 12.2*.

### Protocols

In addition to the standard protocols supported by the Cisco 10000 series ESR, this release supports the following protocols for broadband aggregation:

- PPP sessions encapsulated in L2TP tunnels
- PPPoE Termination
- Routing with Bridged Encapsulations (RBE)
- PPPoX and RBE autosense for LLC/SNAP encapsulation
- PPPoX autosense for SNAP
- PPPoA autosense for MUX encapsulation
- PPPoE and RBE on a VC

### Scalability

Scalability for broadband aggregation for the Cisco 10000 series ESR includes support for the following:

- Up to 32,000 L2TP tunneled PPP sessions or PTA subscribers
- Up to 32,000 VCs (in high VC Count mode only).
- Up to 4,000 VCs (with full functionality)
- Up to 3200 tunnels

### AAA and Address Assignment

The following new AAA and address assignment features are supported in this release:

- PAP/CHAP authentication
- RADIUS based authentication
- IP address assignment from local pools (both configured using CLI and downloaded using RADIUS)
- IP address assignment from RADIUS servers (as part of AAA)
- DHCP relay agent support for unnumbered interfaces
- RADIUS request with VPI/VCI information

### Accounting, Network Management, and Configuration

New router accounting, management, and configuration features in this release include:

- Range based CLI
- Support for Cisco-VPDN-MGMT-MIB
- RADIUS interim accounting
- RADIUS VPI/VCI accounting
- Configuration using RADIUS AV pairs

# Cisco 10000 Series ESR Software Features

Table 1 lists the leased line features based on Cisco IOS Release 12.0(19)SL, and supported in the Cisco 10000 series ESR.

**Table 1** *Principal Software Features*

<b>Administration</b>	Cisco Discovery Protocol (CDP) Simple Network Management Protocol (SNMP)
<b>Availability</b>	Route Processing Redundancy Plus (RPR+)
<b>Encapsulations</b>	Ethernet High-Level Data Link Control (HDLC) Point-to-Point (PPP) Multilink Point-to-Point (MLP)
<b>Multiprotocol Label Switching</b>	Multiprotocol Label Switching Virtual Private Network (MPLS/VPN) edge services 802.1q PXF switching for ARPA encapsulation
<b>Multicast Features</b>	Multicast Static Routes Multicast Routing Monitor (MRM)
<b>Multicast Services</b>	Internet Group Management Protocol (IGMP) Protocol-Independent Multicast (PIM) Distance Vector Multicast Routing Protocol (DVMRP) Cisco Group Management Protocol (CGMP) Unidirectional Link Routing (UDLR) Session Directory Protocol (SDP) Multicast Source Discovery Protocol (MSDP) Border Gateway Protocol (BGP)
<b>Routing Protocols</b>	Border Gateway Protocol (BGP) Intermediate System-to-Intermediate System (IS-IS) Open Shortest Path First (OSPF) Interior Gateway Routing Protocol (IGRP) Enhanced Interior Gateway Routing Protocol (EIGRP) Routing Information Protocol (RIP) Policy Based Routing (PBR)
<b>Security Features</b>	Standard and extended access lists Authentication, Authorization, and Accounting (AAA) Kerberos authentication and client support on Telnet RADIUS authentication Terminal Access Controller Access Control System Plus (TACACS+)

# Limitations and Restrictions

This section describes any limitations and restrictions that you should review before you use the Cisco 10000 series ESR.

## Features Removed to Enable Broadband Aggregation

To add broadband aggregation to this release, it was necessary to remove some software features that are standard features in the Cisco 10000 series ESR. The following software features were removed:

- Multi Link Frame Relay
- Frame Relay
- Netflow Accounting

## Applying ACLs to Virtual Access Interfaces

In Cisco IOS Release 12.2(2)BY1, if you apply an ACL to a virtual access interface template, the ACL is ignored and has no effect.

## Controlling the Rate of Logging Messages

It is important that you limit the rate that system messages are logged by the Cisco 10000 series ESR. This helps to avoid a situation in which the router becomes unstable and the CPU is overloaded. To control the output of messages from the system, use the **logging rate-limit** command.

We recommend that you configure the **logging rate-limit** command as follows:

```
Router(config)# logging rate-limit console all 10 except critical
```

This rate-limits all messages to the console to 10 per second, except for messages with critical priority (level 3) or greater.

For more information on the **logging rate-limit command**, see the *Cisco IOS Configuration Fundamentals Command Reference*.

## Testing Performance of High-Speed Interfaces

Cisco IOS software running on the Cisco 10000 series ESR has multiple queues for all classes of traffic over high-speed interfaces. The software selects a queue based on the source and destination address for the packet. This ensures that a traffic flow always uses the same queue and the packets are transmitted in proper order.

When the Cisco 10000 series ESR is installed in a real network, the high-speed interfaces work efficiently to spread traffic flow equally over the queues. However, using single traffic streams in a laboratory environment may result in less-than-expected performance.

Therefore, to ensure accurate test results, you should test the throughput of the gigabit Ethernet, POS, or ATM uplink with multiple source or destination addresses.



Tip

To determine if traffic is being properly distributed, use the **show hardware pxf cpu queue** command.

## Important Notes

This section contains important issues that you should be aware of with Cisco IOS Release 12.2(2)BY1 and previous releases.

### High VC Count Mode

The new High VC Count mode enables the Cisco 10000 series ESR to support 32,000 VCs with PPPoE, PPPoA, or RBE protocols. The High VC Count mode is set on a per-port basis, and imposes certain limitations, regardless of how the VCs are defined. The following limitations apply in High VC Count mode:

- ACLs and Service-Policies only apply to the physical interface, not to individual VCs
- All VCs on a physical interface must reside in the same VRF
- PVC Discovery is not supported.
- OAM Management is not supported.

To set the router to High VC Count mode, use the **no atm pxf queuing** command.

The following example shows High VC Count mode enabled on an atm port:

```
Router(config)# interface atm 2/0/3
Router(config-if)# no atm pxf queuing
```

### Provisioning for Scaling

Cisco engineers have identified several configuration parameters that enable the Cisco 10000 series ESR to scale the configuration. Please ensure that you have the following commands and parameters in your configuration.

### RADIUS Authentication

If you plan on running RADIUS authentication, set the small, middle, and big buffers to 15000, 12000, and 8000, respectively. You can use the **buffers** command to do this. For example:

```
Router(config)# buffers small perm 15000
Router(config)# buffers mid perm 12000
Router(config)# buffers big perm 8000
```

For typical RADIUS servers, if the RADIUS server is only a few hops away from the router, we recommend that you set the RADIUS server retransmit rate to 5, and the RADIUS server timeout rate to 15, by using the **radius-server** command. For example:

```
Router(config)# radius-server retransmit 5
Router(config)# radius-server timeout 15
```

## L2TP Tunnel Settings

It is mandatory that you configure an L2TP tunnel password with Cisco IOS Release 12.2(2)BY1. You can do this by using the **l2tp tunnel password** command. For example:

```
Router(config)# vpdn-group tunnel1
Router(config-if)# l2tp tunnel password 7
```

The **nosession-timeout** command determines how long a tunnel will persist when there are no sessions in it. You should set this timeout to 30. For example:

```
Router(config)# vpdn-group tunnel1
Router(config-if)# l2tp tunnel nosession-timeout 30
```

You should also configure the L2TP tunnel receive window to 100, with the minimum retransmit timeout of 2, and a maximum retransmit timeout of 8. For example:

```
Router(config)# vpdn-group tunnel1
Router(config-if)# l2tp tunnel receive-window 100
Router(config-if)# l2tp tunnel retransmit timeout min 2
Router(config-if)# l2tp tunnel retransmit timeout max 8
```

If you configure ATM subinterfaces for L2TP tunnels, configure aal5snap encapsulation to avoid a condition where a flapping interface could cause the system to be overloaded with ARP requests. You can do this using the **encapsulation** command. For example:

```
Router(config)# interface atm 5/0/0.4
Router(config-if-atm-vc)# encaps aal5snap
```

## PPP Authentication

To keep the LNS from timing out a PPP authentication process, you should set the ppp timeout to 100 by using the **ppp timeout authentication** command. For example:

```
Router(config)# interface Virtual-Template1
Router(config-if)# ppp timeout authentication 100
```

## Cisco Discovery Protocol

The Cisco Discovery Protocol (CDP) is disabled by default. To maximize scalability with the Cisco 10000 series ESR when running the Cisco IOS Release 12.2(2)BY1 broadband aggregation image, do not enable CDP.

## Gratuitous ARP Requests

To maximize the performance of the router, you need to disable gratuitous ARP requests, by using the **no ip gratuitous-arp** command. For example:

```
Router(config)# no ip gratuitous-arp
```

## keepalive Command

The **keepalive** command is an interface-specific command. If you configure a virtual-template with any form of the **keepalive** command, including the **no keepalive** command, or the **keepalive [seconds]** command, the subinterfaces will not be used with that virtual-template interface.

## Trunk Interface Input Queue

To ensure high scalability, you should set the trunk interface input hold queue to a high value. For example:

```
Router(config)# int gig1/0/0
Router(config-if)# hold-queue 4096 in
```



**Note** The OC-12 ATM line card trunk interface input hold queue defaults to 27230, and in Cisco laboratory tests, the OC-12 ATM line card has achieved the highest scalability at this setting. We recommend that you do not change the default setting.

## AAA Authentication on the NME Port

If you use AAA authentication on the NME port, set both the in and out interface hold queues to 4096. For example:

```
Router(config)# int fe 0/1
Router(config-if)# hold-queue 4096 in
Router(config-if)# hold-queue 4096 out
```

## Virtual Templates and PPP Session Scaling

If you configure a virtual template using interface-specific commands, the Cisco 10000 series ESR does not achieve the highest possible PPP session scaling. To verify that the router has no interface-specific commands within the virtual-template configuration that would limit PPP scaling, use the **test virtual-template <number> sub interface** command.

In the following example, the output of the **test virtual-template <number> sub interface** command indicates that subinterfaces cannot be created using the virtual template. Two interface-specific commands are set: **carrier-delay** and **ip rtp priority**.

```
Router(config)# test virtual-template 11 subinterface
Subinterfaces cannot be created using Virtual-Template11
Interface specific commands:
carrier-delay 45
ip rtp priority 2000 2010 500
```

If you do not use the SNMP management tools of the router to monitor PPP sessions, you can prevent the virtual-access subinterfaces from being registered with the SNMP functionality of the router and using memory by using the **no virtual-template snmp** command. For example:

```
Router(config)# no virtual-template snmp
```

[Table 2](#) lists interface-specific commands that prevent the Cisco 10000 series ESR from attaining the highest possible PPP session scaling.

**Table 2** Interface-Specific Commands that Prevent PPP Scaling

Command	Function
access-expression	Build a bridge boolean access expression
asp	ASP interface subcommands
autodetect	Autodetect encapsulations on serial interface
bridge-group	Transparent bridging interface parameters

**Table 2** *Interface-Specific Commands that Prevent PPP Scaling (continued)*

<b>Command</b>	<b>Function</b>
bsc	BSC interface subcommands
bstun	BSTUN interface subcommands
carrier-delay	Specify delay for interface transitions
cdp	CDP interface subcommands
clock	Configure serial interface clock
compress	Set serial interface for compression
custom-queue-list	Assign a custom queue list to an interface
diffserv	diffserv (Provisioning)
down-when-looped	Force looped serial interface down
encapsulation	Set encapsulation type for an interface
fair-queue	Enable fair queuing on an interface
full-duplex	Configure full-duplex operational mode
h323-gateway	Configure H323 gateway
half-duplex	Configure half-duplex and related commands
help	Description of the interactive help system
hold-queue	Set hold queue depth
keepalive	Enable keepalive
lan-name	LAN name command
lapb	X.25 Level 2 parameters (link access procedure, balanced)
load-interval	Specify interval for load calculation for an interface
locaddr-priority	Assign a priority group
logging	Configure logging for interface
loopback	Configure internal loopback on an interface
mac-address	Manually set interface MAC address
max-reserved-bandwidth	Maximum reservable bandwidth on an Interface
mpoa	MPOA interface configuration commands
multilink	Configure multilink parameters
multilink-group	Put interface in a multilink bundle
netbios	Use a defined NETBIOS access list or enable name-caching
ntp	Configure NTP
priority-group	Assign a priority group to an interface
qos	Quality of Service related commands
random-detect	Enable Weighted Random Early Detection (WRED) on an Interface

**Table 2** *Interface-Specific Commands that Prevent PPP Scaling (continued)*

<b>Command</b>	<b>Function</b>
roles	Specify roles (by entering roles mode)
sap-priority	Assign a priority group
sdllc	Configure SDLC to LLC2 translation
serial	Serial interface commands
snmp	Modify SNMP interface parameters
source	Get config from another source
stun	STUN interface subcommands
transmit-interface	Assign a transmit interface to a receive-only interface
trunk-group	Configure interface to be in a trunk group
tx-ring-limit	Configure PA level transmit ring limit

## Inserting a New Line Card

Unlike other Cisco routers, if you insert a new or different line card into a Cisco 10000 series ESR chassis slot that previously had a line card installed, the line card initially reports that it is administratively up.

## Resolved Problems in Cisco IOS Release 12.2(2)BY2

This section lists problems found since the release of Cisco IOS Release 12.2(2)BY1, and are fixed in Cisco IOS Release 12.2(2)BY2.

### **CSCdw65903**

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

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

# Caveats in Cisco IOS Release 12.2(2)BY1

Table 3 describes the caveats for the Cisco 10000 series ESR running Cisco IOS Release 12.2(2)BY1.

**Table 3** Caveats in Cisco IOS Release 12.2(2)BY1

Caveat	Description
<b>CSCdv57461</b>	<p>If you remove a PVC range containing 32K point-to-multipoint VCs, the following traceback message appears:</p> <pre>%IPGRP-6-NBLKCMD_Q_FULL:Nonblocking IPC command queue full (1000 commands)</pre> <p>This does not affect the operation of the Cisco 10000 series ESR.</p> <p><b>Workaround:</b> There is currently no workaround.</p>
<b>CSCdv77601</b>	<p>If you add configuration commands to an existing configuration that has a large number of VCs, CPU use may increase. For example, in laboratory tests, adding the <b>encapsulation aal5mux ppp Virtual-Template2</b> command to an existing configuration of 8000 VCs caused CPU use to increase.</p> <p><b>Workaround:</b> Add configuration commands when you create the VC configuration.</p>
<b>CSCdv81836</b>	<p>If you use RADIUS accounting on an LNS, NAS-Port (RADIUS attribute 5) is not included in the accounting record.</p> <p><b>Workaround:</b> Disable L2TP tunneling. The Cisco 10000 series ESR will include NAS-Port attribute 5 in the RADIUS accounting record.</p>
<b>CSCdw04680</b>	<p>If you modify vpdn-group parameters while the sessions are authenticating, the following traceback messages appear:</p> <pre>01:02:19: %ALIGN-3-SPURIOUS: Spurious memory access made at 0x606B6078 reading 0x58  01:02:19: %ALIGN-3-TRACE: -Traceback= 606B6078 606B7440 606B7524 606B4D48 606BFF74 606C00F0 606A0F08 6040BCCC  01:02:19: %ALIGN-3-TRACE: -Traceback= 606A0F84 606AEC5C 606AC2EC 606B1AE8 606B762C 606B4D48 606BFF74 606C00F0  01:02:19: %ALIGN-3-TRACE: -Traceback= 606B6078 606AFE48 606B2BA8 6069FC5C 606BFF74 606C00F0 606A0F08 6040BCCC  01:02:19: %ALIGN-3-TRACE: -Traceback= 606A0F84 606AFFC8 606B2BA8 6069FC5C 606BFF74 606C00F0 606A0F08 6040BCCC  01:02:19: %ALIGN-3-TRACE: -Traceback= 606A0F84 60686A0C 606BE148 6069FCE8 606A0EA0 6040BCCC 6040BCB8 00000000  01:02:19: %ALIGN-3-TRACE: -Traceback= 606A0F84 606ACE88 606B2634 60684FC8 60686A2C 606BE148 6069FCE8 606A0EA0  01:02:19: %ALIGN-3-TRACE: -Traceback= 606A0F84 606AEC5C 606AD268 606A0538 606A0838 60433A48 606A085C 606BFF74</pre> <p><b>Workaround:</b> Configure the vpdn-group parameters during maintenance periods, or before bringing users on-line.</p>

**Table 3** *Caveats in Cisco IOS Release 12.2(2)BY1 (continued)*

<b>Caveat</b>	<b>Description</b>
<b>CSCdw06215</b>	If you use the <b>pvc range</b> command, the aggregate Sustainable Cell Rate (SCR) may exceed the bandwidth of the interface. <b>Workaround:</b> There is currently no workaround.
<b>CSCdw09973</b>	If you configure ToS on a virtual template, the inner (users) IP ToS settings are reflected in the outer L2TP IP's ToS settings. <b>Workaround:</b> There is currently no workaround.
<b>CSCdw14527</b>	Immediately after the Cisco IOS software is loaded on the router, a message appears indicating that the line protocol of the installed OC-12 ATM line card is up. This occurs even if the interface cable is not plugged into the line card. <b>Workaround:</b> Shut down the interface, then enable it again. This restores the OC-12 ATM line card interface to the proper state.
<b>CSCdw14567</b>	If you remove the <b>pvc range</b> command from your configuration, the following traceback message appears:  %GENERAL-3-EREVENT: No vc_info for pppoa vccimap indexing  This message does not affect the operation of the Cisco 10000 series ESR. <b>Workaround:</b> There is currently no workaround.
<b>CSCdw26914</b>	Interface numbers that are larger than 10 characters are truncated in the output of the <b>show atm vc</b> command. <b>Workaround:</b> There is currently no workaround.
<b>CSCdw34613</b>	Accounting records on the RADIUS server contain the NAS-IP-Address (attribute 4) of the LNS, instead of the LAC. <b>Workaround:</b> There is currently no workaround.
<b>CSCdw35902</b>	If you use the <b>show interface</b> command to query Toaster Drops and Output Errors for an ATM line card, the values displayed for Toaster Drops and Output Errors may be incorrect. <b>Workaround:</b> There is currently no workaround to view the correct value for Output Errors. To view the correct value for Toaster Drops, use the <b>show hardware pxf cpu queue</b> command.

## Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

## Documentation CD-ROM

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The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

### Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

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

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

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

### Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

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