



# Release Notes for the Cisco 1700 Series Routers for Cisco IOS Release 12.2(15)ZL1

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**June 21, 2004**

These release notes describe new features and significant software components for the Cisco 1700 series routers that support the Cisco IOS Release 12.2(15)T, up to and including Release 12.2(15)ZL1. These release notes are updated as needed to describe new memory requirements, new features, new hardware support, software platform deferrals, microcode or modem code changes, related document changes, and any other important changes. Use these release notes with the [Cross-Platform Release Notes for Cisco IOS Release 12.2\(15\)T](#) located on Cisco.com and the Documentation CD.

For a list of the software caveats that apply to Release 12.2(15)ZL1, see the “[Caveats](#)” section on [page 24](#) and [Caveats for Cisco IOS Release 12.2\(15\)T](#). The online caveats document is updated for every maintenance release and is located on [Cisco.com](#) and the Documentation CD.

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# System Requirements

This section describes the system requirements for Release 12.2(15)ZL1 and includes the following sections:

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## Memory Requirements

Table 1 describes the memory requirements for the Cisco IOS feature sets supported by the Cisco IOS Release 12.2(15)ZL1 on the Cisco 1700 series routers.

**Table 1** Recommended Memory for the Cisco 1700 Series Routers

Platform	Image Name	Feature Set	Image	Flash Memory	DRAM
Cisco 1710	Cisco 1710 IOS IP/IPX/AT/IBM/ FW/IDS PLUS IPSEC 3DES	IP/IPX/AT/IBM/ FW/IDS PLUS IPSEC 3DES	c1710-bk9no3r2sy-mz	16 MB	96 MB
	Cisco 1710 IOS IP/FW/IDS PLUS IPSEC 3DES	IP/FW/IDS PLUS IPSEC 3DES	c1710-k9o3sy-mz	16 MB	64 MB
Cisco 1751, Cisco 1751- V, and Cisco 1760	Cisco 1700 IOS IP/VOICE PLUS	IP/VOICE PLUS	c1700-sv3y-mz	16 MB	64 MB

Table 1 Recommended Memory for the Cisco 1700 Series Routers (continued)

Platform	Image Name	Feature Set	Image	Flash Memory	DRAM
Cisco 1751-V and Cisco 1760	Cisco 1700 IOS IP/ADSL/VOICE PLUS	IP/ADSL/VOICE PLUS	c1700-sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 56	c1700-bk8no3r2sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 3DES	c1700-bk9no3r2sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/VOX/FW/IDS PLUS IPSEC 56	c1700-k8o3sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX PLUS IPSEC 56	IP/ADSL/VOX PLUS IPSEC 56	c1700-k8sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOX/FW/IDS PLUS IPSEC 3DES	c1700-k9o3sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX PLUS IPSEC 3DES	IP/ADSL/VOX PLUS IPSEC 3DES	c1700-k9sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/VOX/FW/IDS PLUS	IP/ADSL/IPX/VOX/FW/IDS PLUS	c1700-no3sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX/FW/IDS PLUS	IP/ADSL/VOX/FW/IDS PLUS	c1700-o3sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOX PLUS	IP/ADSL/VOX PLUS	c1700-sv8y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 56	c1700-bk8no3r2sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 3DES	IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 3DES	c1700-bk9no3r2sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOICE/FW/IDS PLUS IPSEC 56	IP/ADSL/VOICE/FW/IDS PLUS IPSEC 56	c1700-k8o3sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOICE PLUS IPSEC 56	IP/ADSL/VOICE PLUS IPSEC 56	c1700-k8sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOICE/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOICE/FW/IDS PLUS IPSEC 3DES	c1700-k9o3sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/VOICE PLUS IPSEC 3DES	IP/ADSL/VOICE PLUS IPSEC 3DES	c1700-k9sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/ADSL/IPX/VOICE/FW/IDS PLUS	IP/ADSL/IPX/VOICE/FW/IDS PLUS	c1700-no3sv3y7-mz	32 MB	96 MB

Table 1 Recommended Memory for the Cisco 1700 Series Routers (continued)

Platform	Image Name	Feature Set	Image	Flash Memory	DRAM
Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP/ADSL/VOICE/ FW/IDS PLUS	IP/ADSL/VOICE/ FW/IDS PLUS	c1700-o3sv3y7-mz	32 MB	96 MB
	Cisco 1700 IOS IP/VOX PLUS	IP/VOX PLUS	c1700-sv8y-mz	32 MB	96 MB
Cisco 1721, Cisco 1751, Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP/IPX	IP/IPX	c1700-ny-mz	16 MB	48 MB
	Cisco 1700 IOS IP/IPX/AT/IBM	IP/IPX/AT/IBM	c1700-bnr2y-mz	16 MB	48 MB
	Cisco 1700 IOS IP/FW/IDS	IP/FW/IDS	c1700-o3y-mz	16 MB	48 MB
	Cisco 1700 IOS IP/PLUS	IP/PLUS	c1700-sy-mz	16 MB	64 MB
Cisco 1720, Cisco 1721, Cisco 1751, Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP	IP	c1700-y-mz	16 MB	32 MB
Cisco 1701, Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP/ADSL/IPX/AT/ IBM/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/ IBM/FW/IDS PLUS IPSEC 56	c1700-bk8no3r2sy7-mz	32 MB	96 MB
Cisco 1701, Cisco 1711, Cisco 1712, Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP/ADSL/IPX/AT/ IBM/FW/IDS PLUS IPSEC 3DES	IP/ADSL/IPX/AT/ IBM/FW/IDS PLUS IPSEC 3DES	c1700-bk9no3r2sy7-mz	32 MB	96 MB
Cisco 1701, Cisco 1721, Cisco 1751, Cisco 1751-V, and Cisco 1760	Cisco 1700 IOS IP/ADSL/FW/IDS PLUS IPSEC 56	IP/ADSL/FW/IDS PLUS IPSEC 56	c1700-k8o3sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL PLUS IPSEC 56	IP/ADSL PLUS IPSEC 56	c1700-k8sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL/FW/IDS PLUS IPSEC 3DES	IP/ADSL/FW/IDS PLUS IPSEC 3DES	c1700-k9o3sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL PLUS IPSEC 3DES	IP/ADSL PLUS IPSEC 3DES	c1700-k9sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL/IPX/FW/ IDS PLUS	IP/ADSL/IPX/FW/ IDS PLUS	c1700-no3sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL/IPX/AT/ IBM PLUS	IP//ADSL/IPX/AT/ IBM PLUS	c1700-bnr2sy7-mz	16 MB	64 MB
	Cisco 1700 IOS IP/ADSL PLUS	IP/ADSL PLUS	c1700-sy7-mz	16 MB	64 MB

**Table 1** Recommended Memory for the Cisco 1700 Series Routers (continued)

Platform	Image Name	Feature Set	Image	Flash Memory	DRAM
Cisco 1701, Cisco 1720, Cisco 1721, Cisco 1751, Cisco 1751- V, and Cisco 1760	Cisco 1700 IOS IP/ADSL	IP/ADSL	c1700-y7-mz	16 MB	48 MB
Cisco 1701, Cisco 1711, Cisco 1712, Cisco 1721, Cisco 1751, Cisco 1751- V, and Cisco 1760	Cisco 1700 IOS IP/ADSL/FW/IDS PLUS IPSEC 3DES	IP/ADSL/FW/IDS PLUS IPSEC 3DES	c1700-k9o3sy7-mz	32 MB	64 MB

## Hardware Supported

Cisco IOS Release 12.2(15)ZL1 supports the following Cisco 1700 series routers:

- Cisco 1701 router
- Cisco 1710 router
- Cisco 1711 router
- Cisco 1712 router
- Cisco 1720 router
- Cisco 1721 router
- Cisco 1751 and 1751-V routers
- Cisco 1760

The Cisco 1701, Cisco 1710, Cisco 1711, Cisco 1712, Cisco 1720, and Cisco 1721 routers run data images only. The Cisco 1751, Cisco 1751-V, and Cisco 1760 routers run data or data-and-voice images, providing digital and analog voice support. The Cisco 1711 and Cisco 1712 routers run IPsec Triple Data Encryption Standard (3DES) images only (the Cisco 1700 IOS IP/ADSL/IPX/AT/IBM/FW/IDS PLUS IPSEC 3DES and the Cisco 1700 IOS IP/ADSL/FW/IDS PLUS IPSEC 3DES images).

For descriptions of existing hardware features and supported modules, see the hardware installation guides, configuration and command reference guides, and additional documents specific to the Cisco 1700 series routers, which are available on Cisco.com and the Documentation CD at the following location:

[http://www.cisco.com/univercd/cc/td/doc/product/access/acs\\_mod/1700/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1700/index.htm)

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

**Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1700 Series Routers: <platform\_name>**

## Determining the Software Version

To determine which version of Cisco IOS software is currently running on your Cisco 1700 series router, log in to the router and enter the **show version EXEC** command. The following sample output from the **show version** command indicates the version number.

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) C1700 Software (C1700-NY-MZ), Version 12.2(15)ZL1, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
Synched to technology version 12.3(0.1)
```

## Upgrading to a New Software Release

For general information about upgrading to a new software release, refer to the *Software Installation and Upgrade Procedures* located at [http://www.cisco.com/warp/public/130/upgrade\\_index.shtml](http://www.cisco.com/warp/public/130/upgrade_index.shtml).

## Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images, depending on the platform. Each feature set contains a specific set of Cisco IOS features. Release 12.2(15)ZL1 supports the same feature sets as Releases 12.2 and 12.2(15)T, but Release 12.2(15)ZL includes new features supported by the Cisco 1700 series routers.



### Caution

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

Table 2 through Table 11 list the features and feature sets supported in the Cisco IOS Release 12.2(15)ZL.

The tables use the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.
- In—The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, “12.2(15)ZL” means that the feature was introduced in 12.2(15)ZL. If a cell in this column is empty, the feature was included in a previous release or in the initial base release.



### Note

These feature set tables contain only a selected list of features, which are cumulative for Release 12.2(15)*nn* early deployment releases only (*nn* identifies each early deployment release). The tables do not list all features in each image—additional features are listed in the [Cross-Platform Release Notes for Cisco IOS Release 12.2\(15\)T](#) and Release 12.2(15)T Cisco IOS documentation.

**Table 2** Feature List by Feature Set for Cisco 1710 Routers

Feature	In	Feature Set	
		IP/IPX/AT/ IBM/FW/IDS PLUS IPSEC 3DES	IP/FW/IDS PLUS IPSEC 3DES
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No	No

**Table 2** Feature List by Feature Set for Cisco 1710 Routers (continued)

Feature	In	Feature Set	
		IP/IPX/AT/ IBM/FW/IDS PLUS IPSEC 3DES	IP/FW/IDS PLUS IPSEC 3DES
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	No	No
WIC-1DSU-T1-V2	12.2(15)ZL	No	No
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No	No

**Table 3** Feature List by Feature Set for Cisco 1751, 1751-V, and 1760 Routers

Feature	In	Feature Set
		IP/VOICE PLUS
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	Yes
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	Yes
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	Yes
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	Yes
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	Yes
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No



**Table 3 Feature List by Feature Set for Cisco 1751, 1751-V, and 1760 Routers (continued)**

Feature	In	Feature Set
		IP/VOICE PLUS
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	No
WIC-1DSU-T1-V2	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

**Table 4, Part 1 Feature List by Feature Set for Cisco 1751-V and 1760 Routers**

Feature	In	Feature Set						
		IP/ADSL/VOICE PLUS	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/VOX PLUS IPSEC 56	IP/ADSL/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOX PLUS IPSEC 3DES
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	Yes	Yes	Yes	No	No	No	Yes
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No	No	No	No	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	Yes	Yes	No	Yes	Yes	Yes	Yes
WIC-1DSU-T1-V2	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4, Part 1 Feature List by Feature Set for Cisco 1751-V and 1760 Routers (continued)

Feature	In	Feature Set						
		IP/ADSL/VOICE PLUS	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/IBM/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOX/FW/IDS PLUS IPSEC 56	IP/ADSL/VOX PLUS IPSEC 56	IP/ADSL/VOX/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOX PLUS IPSEC 3DES
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No	Yes	Yes	Yes	Yes	Yes	Yes
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No	Yes	Yes	Yes	Yes	Yes	Yes

Table 4, Part 2 Feature List by Feature Set for Cisco 1751-V and 1760 Routers

Feature	In	Feature Set					
		IP/ADSL/IPX/VOX/FW/IDS PLUS	IP/ADSL/VOX/FW/IDS PLUS	IP/ADSL/VOX PLUS	IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 56	IP/ADSL/IPX/AT/IBM/VOICE/FW/IDS PLUS IPSEC 3DES	IP/ADSL/VOICE/FW/IDS PLUS IPSEC 56
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No	No	No	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
WIC-1DSU-T1-V2	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes

**Table 4, Part 2** Feature List by Feature Set for Cisco 1751-V and 1760 Routers (continued)

Feature	In	Feature Set					
		IP/ADSL/ IPX/VOX/ FW/IDS PLUS	IP/ADSL/ VOX/FW/ IDS PLUS	IP/ADSL/ VOX PLUS	IP/ADSL/ IPX/AT/ IBM/VOICE/ FW/IDS PLUS IPSEC 56	IP/ADSL/ IPX/ AT/IBM/ VOICE/ FW/IDS PLUS IPSEC 3DES	IP/ADSL/ VOICE/FW/ IDS PLUS IPSEC 56
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	Yes	Yes	Yes	No	No	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	Yes	Yes	Yes	No	No	No

**Table 4, Part 3** Feature List by Feature Set for Cisco 1751-V and 1760 Routers

Feature	In	Feature Set					
		IP/ADSL/ VOICE PLUS IPSEC 56	IP/ADSL/ VOICE/FW/ IDS PLUS IPSEC 3DES	IP/ADSL/ VOICE PLUS IPSEC 3DES	IP/ADSL/ IPX/VOICE/ FW/IDS PLUS	IP/ADSL/ VOICE/ FW/IDS PLUS	IP/VOX PLUS
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port BRI VIC (VIC2-2BRI)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No	No	No	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	No
WIC-1DSU-T1-V2	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes

**Table 4, Part 3** Feature List by Feature Set for Cisco 1751-V and 1760 Routers (continued)

Feature	In	Feature Set					
		IP/ADSL/ VOICE PLUS IPSEC 56	IP/ADSL/ VOICE/FW/ IDS PLUS IPSEC 3DES	IP/ADSL/ VOICE PLUS IPSEC 3DES	IP/ADSL/ IPX/VOICE/ FW/IDS PLUS	IP/ADSL/ VOICE/ FW/IDS PLUS	IP/VOX PLUS
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No	No	No	No	No	Yes
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No	No	No	No	No	Yes

**Table 5** Feature List by Feature Set for Cisco 1721, 1751, 1751-V, and 1760 Routers

Feature	In	Feature Set			
		IP/IPX	IP/IPX/AT/ IBM	IP/FW/ IDS	IP/PLUS
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No	No	No	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No	No	No	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No	No	No	No
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No	No	No	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No	No	No	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	No	No	No	No
WIC-1DSU-T1-V2	12.2(15)ZL	Yes	Yes	Yes	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No	No	No	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No	No	No	No

**Table 6** Feature List by Feature Set for Cisco 1720, 1721, 1751, 1751-V, and 1760 Routers

Feature	In	Feature Set
		IP
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)	12.2(15)ZL	No
WIC-1DSU-T1-V2	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

**Table 7** Feature List by Feature Set for Cisco 1701, 1751-V, and 1760 Routers

Feature	In	Feature Set
		IP/ADSL/IPX/ AT/IBM/FW/ IDS PLUS IPSEC 56
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No

**Table 7 Feature List by Feature Set for Cisco 1701, 1751-V, and 1760 Routers (continued)**

Feature	In	Feature Set
		IP/ADSL/IPX/ AT/IBM/FW/ IDS PLUS IPSEC 56
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) <sup>1</sup>	12.2(15)ZL	Yes
WIC-1DSU-T1-V2 <sup>2</sup>	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

1. The Cisco 1701 router is a fixed-configuration router, and does not support the ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) feature.
2. The Cisco 1701 router is a fixed-configuration router, and does not support WIC-1DSU-T1-V2 feature.

**Table 8 Feature List by Feature Set for Cisco 1701, 1711, 1712, 1751-V, and 1760 Routers**

Feature	In	Feature Set
		IP/ADSL/IPX/ AT/IBM/FW/ IDS PLUS IPSEC 3DES
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No

**Table 8** Feature List by Feature Set for Cisco 1701, 1711, 1712, 1751-V, and 1760 Routers (continued)

Feature	In	Feature Set
		IP/ADSL/IPX/ AT/IBM/FW/ IDS PLUS IPSEC 3DES
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	Yes
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) <sup>1</sup>	12.2(15)ZL	Yes
WIC-1DSU-T1-V2 <sup>2</sup>	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

1. The Cisco 1701, 1711, and 1712 routers are fixed-configuration router, and does not support the ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) feature.
2. The Cisco 1701, 1711, and 1712 routers are fixed-configuration router, and does not support WIC-1DSU-T1-V2 feature.

**Table 9** Feature List by Feature Set for Cisco 1701, 1721, 1751, 1751-V, and 1760 Routers

Feature	In	Feature Set						
		IP/ADSL/ FW/IDS PLUS IPSEC 56	IP/ADSL PLUS IPSEC 56	IP/ADSL/ FW/IDS PLUS IPSEC 3DES	IP/ADSL PLUS IPSEC 3DES	IP/ADSL/ IPX/FW/ IDS PLUS	IP/ADSL/ IPX/AT/ IBM PLUS	IP/ADSL PLUS
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No	No	No	No	No	No	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No	No	No	No	No	No	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No	No	No	No	No	No	No

**Table 9 Feature List by Feature Set for Cisco 1701, 1721, 1751, 1751-V, and 1760 Routers (continued)**

Feature	In	Feature Set						
		IP/ADSL/ FW/IDS PLUS IPSEC 56	IP/ADSL PLUS IPSEC 56	IP/ADSL/ FW/IDS PLUS IPSEC 3DES	IP/ADSL PLUS IPSEC 3DES	IP/ADSL/ IPX/FW/ IDS PLUS	IP/ADSL/ IPX/AT/ IBM PLUS	IP/ADSL PLUS
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No	No	No	No	No	No	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No	No	No	No	No	No	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No	No	No	No	No	No	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) <sup>1</sup>	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WIC-1DSU-T1-V2 <sup>2</sup>	12.2(15)ZL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No	No	No	No	No	No	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No	No	No	No	No	No	No

1. The Cisco 1701 router is a fixed-configuration router, and does not support the ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) feature.
2. The Cisco 1701 router is a fixed-configuration router, and does not support WIC-1DSU-T1-V2 feature.

**Table 10 Feature List by Feature Set for Cisco 1701, 1720, 1721, 1751, 1751-V, and 1760 Routers**

Feature	In	Feature Set
		IP/ADSL
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No



**Table 10 Feature List by Feature Set for Cisco 1701, 1720, 1721, 1751, 1751-V, and 1760 Routers (continued)**

Feature	In	Feature Set
		IP/ADSL
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	No
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) <sup>1</sup>	12.2(15)ZL	Yes
WIC-1DSU-T1-V2 <sup>2</sup>	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

1. The Cisco 1701 router, a fixed-configuration router, and the Cisco 1720 router does not support the ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) feature.
2. The Cisco 1701 router is a fixed-configuration router, and does not support WIC-1DSU-T1-V2 feature.

**Table 11 Feature List by Feature Set for Cisco 1701, 1711, 1712, 1721, 1751, 1751-V, and 1760 Routers**

Feature	In	Feature Set
		IP/ADSL/FW/IDS PLUS IPSEC 3DES
Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)	12.2(15)ZL	No
Two-Port BRI VIC (VIC2-2BRI-NT/TE)	12.2(15)ZL	No
Two-Port Ear and Mouth VIC (VIC2-2E/M)	12.2(15)ZL	No
Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)	12.2(15)ZL	No
Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)	12.2(15)ZL	No
Cisco 1711/1712 Security Access Routers	12.2(15)ZL	Yes

**Table 11** Feature List by Feature Set for Cisco 1701, 1711, 1712, 1721, 1751, 1751-V, and 1760 Routers (continued)

Feature	In	Feature Set
		IP/ADSL/FW/ IDS PLUS IPSEC 3DES
ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) <sup>1</sup>	12.2(15)ZL	Yes
WIC-1DSU-T1-V2 <sup>2</sup>	12.2(15)ZL	Yes
Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager	12.2(15)ZL	No
Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities	12.2(15)ZL	No

1. The Cisco 1701, 1711, and 1712 routers are fixed-configuration router, and does not support the ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG) feature.
2. The Cisco 1701, 1711, and 1712 routers are fixed-configuration router, and does not support WIC-1DSU-T1-V2 feature.

# New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 1700 series routers for Release 12.2(15)ZL.

## New Hardware Features in Release 12.2(15)ZL

The following sections describe the new hardware features supported by the Cisco 1700 series routers for Release 12.2(15)ZL.

### Two-Port Foreign Exchange Station Voice Interface Card (VIC2-2FXS)

This two port Foreign Exchange Station (FXS) voice interface card (VIC) is a newer version of the existing card that can be used for connecting directly to a standard telephone, fax machine, or similar device, and supplies ring, voltage, and dial tone. The FXS interface is an RJ-11 connector that connects to basic telephone service equipment, key sets, and private branch exchanges (PBXs). Ports on this VIC are color-coded gray.

### Two-Port BRI VIC (VIC2-2BRI-NT/TE)

This new VIC provides the BRI network side feature to the Cisco 1751, 1751-V, and 1760 routers as provided by the previous VIC (VIC-2BRI-NT/TE). This feature allows BRI ports on the routers to act as ISDN network-side devices. The NT interface on the router allows the customer to connect ISDN PBXs and key systems to a multiservice network with a minimum configuration changes on the PBX. This module also provides -48V phantom power to PBXs and key switches that require it. The Cisco IOS software replicates the public switched telephone network (PSTN) interface to a PBX that is compatible with the European Telecommunications Standards Institute (ETSI) Net3 and QSIG switch types.

The typical application of BRI-NT allows enterprise customers with a large installed base of legacy telephony equipment to bypass the public telephone network.

This card gives users the flexibility to configure the BRI port to either the user side or the network side. When configured as the network side, the router provides ISDN network-side services. When configured as the user side, the BRI port can be connected to an ISDN network.

The VIC2-2BRI-NT/TE card provides the following benefits:

- Allows the user to bypass PSTN tariff services.
- Allows the user's PBXs to be connected directly to a Cisco router, which allows PBX station calls to be routed automatically to the WAN.
- Allows the user to configure a voice interface on a Cisco router to emulate either a TE or NT interface. Users with all types of PBXs can send calls through a Cisco router and deliver those calls across the customer network.
- A previous VIC card (VIC-2BRI-NT/TE), running the Cisco IOS version 12.1(3)XI or later, can now be configured as an NT interface as well. However, note that the older card does not provide phantom power.
- Layer 2 and 3 operation may be configured as point-to-point (static TEI) or point-to-multipoint (automatic TEI).

- Clocking considerations

The VIC2-2BRI-NT/TE VIC can now either source or sync clock from each interface regardless of whether the interfaces are configured as network side or user side. The customer's connection can take a clock source from one port on any of these interfaces (applies to both the original and new hardware) and source that clock to any of the other interfaces. An application of this is to connect one BRI port which would be configured as a user side to the PSTN connection and to then use that clock as the source clock to the other physical ports (which would be configured as a network side) to the connected PBX/private automated branch exchange (PABX). This provides the connected PBX/PABX with exactly the same clock being received from the PSTN, central office (CO), or Post, Telephone, and Telegraph (PTT). The voice port connected to the PSTN, CO, or PTT may be used as a voice gateway connection for inbound and outbound voice calls from and to the PSTN, CO, or PTT in addition to sourcing the clock used to clock another NT port.

- Supporting NT and TE on the same BRI module

Each port on a BRI module (VIC and BVM) can support either the NT or TE side. It is possible to support NT and TE on the same module. The consideration is to ensure that clocking is configured correctly.

- Connecting a BRI-NT interface on one router to a BRI-TE interface on a second router

In some testing scenarios, it is necessary to connect a BRI-NT module on one router to a BRI-TE interface in a second router. The only consideration is to ensure that clocking is configured correctly so that no clock collision occurs.

- Support of point-to-multipoint configuration with different TEI values

The router does not support point-to-multipoint configuration and can provide only one TEI value per BRI port. The router supports automatic TEI but will assign only one TEI (TEI 64) to the TE. The router must support automatic TEI because some PBXs require it even when there is a need to connect only one TEI. When the PBX sends the Link Access Procedure on the D channel (LAPD) ID request, it expects the router to respond to it. Because the router assigns only one TEI, multiple TEs cannot be served. In summary, the router supports the automatic TEI "procedure" but does not provide more than one TEI.

- Connecting an ISDN phone directly to the BRI port which is configured as network side

Even though the router is acting as the network side, an ISDN phone is not supported and thus should not be connected directly to the BRI ports on the router. Currently the BRI port does not support S-Bus and D-channel collision.

The ISDN switch types currently supported for the network side interface are Basic-NET3 and Basic-QSIG. Other switch types will only be supported as user side.

- When configured as an NT port, a "rolled" cable (transmit and receive swapped) is needed for connecting to a TE interface.
- Currently, Layer one can only be configured as point-to-point (1 TE connected to each NT). Automatic TEI support will only issue one TEI.

## Two-Port Ear and Mouth VIC (VIC2-2E/M)

The 2-port E&M (ear and mouth) or receive and transmit (2E/M) VIC is a newer version of the existing card which supports the most common form of analog trunking, the E/M interface. E/M signaling is commonly referred to as ear and mouth or recEive and transMit. E/M signaling defines a trunk circuit side and a signaling unit side for each connection and is similar to the data circuit-terminating equipment (DCE) and data terminal equipment (DTE) reference type. The PBX is usually is the trunk circuit side and the telco, CO, or Cisco voice enabled platform is the signaling unit side.

The two port E&M voice/fax interface card supports 2- and 4-wire interfaces and is used for connecting to the trunk side of the PBX for PBX-to-PBX connections. This card supports 2- and 4-wire, E/M signaling types, I, II, III, and V via RJ-45 connectors.



Note

Cisco's analog E&M interface functions as the signaling unit side, so it expects the other side to be a trunk circuit. When using E/M interface models type II and type V, two signaling unit sides can be connected back to back by appropriate crossing of the signaling leads.

## Two-Port Foreign Exchange Office Voice Interface Card (VIC2-2FXO)

The Cisco 1751, 1751-V, and 1760 routers now support a 2-port Foreign Exchange Office (FXO) VIC that is user configurable with battery reversal for North America, Europe, or Australia. An FXO interface connects local calls to a public switched telephone network (PSTN) central office, or to a PBX that does not support E/M signaling. This is the interface a standard telephone provides. Cisco's FXO interface is an RJ-11 connector that allows an analog connection to be directed at the PSTN's central office or to a station interface on a PBX. The FXO is on the switch end of the connection. It plugs directly into the line side of the switch so the switch thinks the FXO interface is a telephone. This FXO card can also be configured for TBR 21 support. Ports on this VIC are color-coded pink.

## Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)

The Cisco 1751, 1751-V and 1760 routers now support a two port FXO VIC which is user configurable with battery reversal for North America, Europe or Australia. An FXO interface connects local calls to a public switched telephone network central office, or to a PBX that does not support E/M signaling. Cisco's FXO interface is an RJ-11 connector that allows an analog connection to be directed at the PSTN's central office or to a station interface on a PBX. The FXO sits on the switch end of the connection. It plugs directly into the line side of the switch so the switch thinks the FXO interface is a telephone. This FXO card can also be configured for TBR 21 support. Ports on this VIC are color-coded pink.

## Cisco 1711/1712 Security Access Routers

The fixed security access routers Cisco 1711 and Cisco 1712 are newly introduced to the family of Cisco Access Routers and include a 4-port 10/100BASE-T switch and integrated analog modem (the Cisco 1711 router) or the ISDN S/T port (the Cisco 1712 router). The routers provide a complete security solution that delivers IPsec Triple DES (3DES) Data Encryption Virtual Private Network (VPN), firewall, and intrusion detection system (IDS).

## ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)

The ADSL over POTS WIC with Dying Gasp support (part number WIC-1ADSL-DG) conforms to Cisco WICs/Voice Interface Cards (VIC) and enables ADSL services to be deployed. The WIC supports the Annex A, G.992.1 technical specifications and complies with ANSI T1.413 Issue 2. It targets the business ADSL over POTS service worldwide. The dying gasp support on this ADSL over POTS WIC supports a *dying gasp* message that is sent by the Customer Premises Equipment Device (CPE — for example, a Cisco 1760 access router with an installed WIC-1ADSL-DG) to the digital subscriber line access multiplier (DSLAM) when a power outage occurs (i.e. the WIC-1ADSL-DG supports DSLAM notification on power loss).

## WIC-1DSU-T1-V2

The Cisco WIC-1DSU-T1-V2 is an integrated, managed, T1 or fractional T1 WAN interface card (WIC). It provides non-channelized data rates of 1 to 24 X 64 kbps or 1 to 24 X 56 kbps and follows ANSI T1.403 and AT&T Publication 62411 standards.

The Cisco WIC-1DSU-T1-V2 interface management features include the following:

- You can remotely configure the interface using Telnet and the Cisco IOS command line interface (CLI).
- For monitoring purposes, the router and data service unit/channel service unit (DSU/CSU) are manageable as a single Simple Network Management Protocol (SNMP) entity, by using CiscoWorks or CiscoView. DSU/CSU statistics are accessed from the CLI.
- The SNMP agent supports the standard Management Information Base II (MIB II), Cisco integrated DSU/CSU MIB, and T1 MIB (RFC 1406).
- Loopbacks (including a manual button for a network line loopback) are provided for troubleshooting.
- Transmission attenuation can be tailored to cable length using the CLI.
- Test patterns, alarm counters, and performance reports are accessible using the CLI.
- The module has carrier detect, loopback, and alarm LEDs.

## New Software Features in Release 12.2(15)ZL

The following sections describe the new software features supported by the Cisco 1700 series routers for Release 12.2(15)ZL.

### Customizable Tone Download to the Cisco IOS MGCP Gateways from Cisco CallManager

The internationalization and localization enhancements in Cisco CallManager 3.3 require the Cisco IOS Media Gateway Control Protocol (MGCP) gateways to support three to four multifrequency tones and customizable tone download to gateways from Cisco CallManager.

All the Cisco IOS gateway currently support static tones that are pre-defined in the Cisco IOS tone tables. The Custom Tone Download to Cisco IOS MGCP Gateways from Cisco CallManager feature enables the automatic download from a TFTP server of locale-specific tones and their associated frequencies (up to four), amplitude, and cadence information into a custom tone table using XML-based configuration files.

For more details on this feature, refer to the following URL:

[http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zj15/gt\\_tones.htm](http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zj15/gt_tones.htm)

### Cisco IOS MGCP Gateway Support for Cisco CallManager Network-Specific Facilities

This feature adds Cisco IOS MGCP gateway support for the Cisco CallManager Network-Specific Facilities (NSF). The feature allows users to configure the NSF ISDN information element in the route pattern user interface page. This will enable users to invoke network-specific services and facilities on a call-by-call basis when a user dials the route pattern.

For more details on this feature, refer to the following URL:

[http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zj15/gt\\_nsf.htm](http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122newft/122limit/122z/122zj15/gt_nsf.htm)

## New Software Features in Release 12.2(15)T

For information regarding the features supported in the Cisco IOS Release 12.2(15)T, refer to the Cross-Platform Release Notes and New Feature Documentation links at the following location on Cisco.com:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122relnt/xprn122t/index.htm>

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

**Service & Support: Technical Documents: Cisco IOS Software: Release 12.2: Release Notes: Cross-Platform Release Notes (Cisco IOS Release 12.2(15)T)**

## Important Notes

The following sections describe important notes concerning the new software features supported by the Cisco 1700 series routers for Release 12.2(15)ZL.

### VIC2-2FXS, VIC2-2BRI-NT/TE, VIC2-2FXO, VIC2-2E/M, VIC2-4FXO

In some instances, when the command **show diag** is entered, the message “Unknown field” is displayed. This is due to the fact that in some instances the card information is not pre-programmed for the following voice interface cards:

VIC2-2FXS

VIC2-2FXO

VIC2-4FXO

VIC2-2E/M

VIC2-2BRI-NT/TE

No workaround is in place since this does not affect the functionality of the voice interface cards.

## Limitations

The following sections describe limitations concerning the new hardware and software features supported by the Cisco 1700 series routers for Release 12.2(15)ZL.

### Four-Port Foreign Exchange Office Voice Interface Card (VIC2-4FXO)

When configured for operation in countries that use TBR21 mode, the use of VIC2-4FXO cards is subject to the following limitations:

- In the Cisco 1751 router, a maximum of one VIC2-4FXO card can be supported.

- In the Cisco 1760 router, a maximum of two VIC2-4FXO cards can be supported.

When not operating in the TBR21 mode, these limitations do not apply.

These restrictions do not apply to VIC2-2FXO cards.

## ADSL over POTS WIC with Dying Gasp Support (WIC-1ADSL-DG)

The Cisco ADSL WAN interface cards do not support dual-latency, ADSL Plus. When the ADSL link is intended to support both voice and data traffic simultaneously, the link should be configured for either all fast-path data or all interleave data, with an interleave depth of zero to ensure that latency is minimized. In addition, the total supported data rate must be reduced to adjust for the reduced coding gain, which is usually present with high-latency traffic.

## Caveats

Caveats describe unexpected behavior or defects in the Cisco IOS software releases. Severity 1 caveats are the most serious caveats, severity 2 caveats are less serious, and severity 3 caveats are the least serious of these three severity levels.

Caveats in Cisco IOS Release 12.2(15)T are also in Release 12.2(15)ZL1. For information on caveats in Cisco IOS Release 12.2(15)T, refer to the *Caveats for Cisco IOS Release 12.2(15)T* document. For information on caveats in Cisco IOS Release 12.2, refer to the *Caveats for Cisco IOS Release 12.2* document. These documents list severity 1 and 2 caveats; the documents are located on Cisco.com and the Documentation CD.



### Note

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

## Open Caveats for Release 12.2(15)ZL

The following sections list the open caveats for the Cisco IOS Release 12.2(15)ZL.

- CSCea79598—Sometimes the FXO card does not receive dual-tone multifrequency (DTMF) digits properly in a trunking connection if the digits were sent out immediately after an FXO off-hook event (within 300 milliseconds). This could happen if an immediate digit forwarding scheme is used, for example if **no digit-strip** command is configured on the dial peer.

### Workaround

Configure a delay of 300 milliseconds or longer in the device connected to the FXO card to send DTMF digits.

- CSCeb28091—The Cisco Networking Services (CNS) agents are not supported in the Cisco IOS Release 12.2(15)ZL.

### Workaround

None.



- CSCin47054—Error history observed after configuration download for T1 interfaces.  
Configuration error history is seen in the **show ccm-manager** command output after the configuration is downloaded. However, the functionality of the gateways are not affected.

**Workaround**

None.

- CSCdz74611—Error tone when VIC-4FXS/direct inward dial (DID) is configured with the **dial-type pulse** command.

When either a VIC-4FXS/DID or VIC2-2FXS is connected back-to-back with a VIC-2FXO, pulse dialing from FXO to FXS may not work.

**Workaround**

None.

## Resolved Caveats for Release 12.2(15)ZL

The following sections list the resolved caveats for the Cisco IOS Release 12.2(15)ZL.

- CSCeb19648—The ADSL WIC sends 24 B vendor-ID to the digital subscriber line access multiplier (DSLAM).
- CSCdy62144—The number of cyclic redundancy check (CRC) errors increases without any traffic being sent through the ADSL WIC.
- CSCdz11102—The ADSL WIC is flapping with upstream configuration for more than 512 KB.

**Workaround**

Set the upstream bandwidth below 512 KB.

- CSCdz19017—The ADSL WIC has lower downstream speeds than the WIC1-ADSL card.
- CSCdy63105—Cannot train the line either in American National Standards Institute (ANSI) T.413 mode or in auto mode.

**Workaround**

None.

- CSCdu53656

A Cisco device running IOS and enabled for the Border Gateway Protocol (BGP) is vulnerable to a Denial of Service (DOS) attack from a malformed BGP packet. The BGP protocol is not enabled by default, and must be configured in order to accept traffic from an explicitly defined peer. Unless the malicious traffic appears to be sourced from a configured, trusted peer, it would be difficult to inject a malformed packet. BGP MD5 is a valid workaround for this problem.

Cisco has made free software available to address this problem. For more details, please refer to this advisory, available at <http://www.cisco.com/warp/public/707/cisco-sa-20040616-bgp.shtml>.

- CSCea28131

A Cisco device running IOS and enabled for the Border Gateway Protocol (BGP) is vulnerable to a Denial of Service (DOS) attack from a malformed BGP packet. The BGP protocol is not enabled by default, and must be configured in order to accept traffic from an explicitly defined peer. Unless the malicious traffic appears to be sourced from a configured, trusted peer, it would be difficult to inject a malformed packet. BGP MD5 is a valid workaround for this problem.

Cisco has made free software available to address this problem. For more details, please refer to this advisory, available at <http://www.cisco.com/warp/public/707/cisco-sa-20040616-bgp.shtml>.

## Related Documentation

The following sections describe the documentation available for the Cisco 1700 series routers. Typically, these documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, feature modules, and other documents. Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online on Cisco.com and the Documentation CD.

Use these release notes with the documents listed in the following sections:

- [Release-Specific Documents](#)
- [Platform-Specific Documents](#)

## Release-Specific Documents

The following documents are specific to Release 12.2 and apply to Release 12.2(15)ZL. They are located on Cisco.com and the Documentation CD (under the heading Service & Support):

- To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.2(15)T*, click this path:  
**Technical Documents: Cisco IOS Software: Release 12.2: Release Notes: Cisco IOS Release 12.2(15)T**
- To reach product bulletins, field notices, and other release-specific documents, click this path:  
**Technical Documents: Product Bulletins**
- To reach the *Caveats for Cisco IOS Release 12.2* and *Caveats for Cisco IOS Release 12.2(15)T* documents, which contain caveats applicable to all platforms for all maintenance releases of Release 12.2, click this path:  
**Technical Documents: Cisco IOS Software: Release 12.2: Caveats**



### Note

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

## Platform-Specific Documents

Hardware installation guides, configuration and command reference guides, and additional documents specific to the Cisco 1700 series routers are available on Cisco.com and the Documentation CD at the following location:

[http://www.cisco.com/univercd/cc/td/doc/product/access/acs\\_mod/1700/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/1700/index.htm)

This URL is subject to change without notice. If it changes, point your web browser to Cisco.com, and click the following path:

**Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1700 Series Routers: <platform\_name>**

# Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

## World Wide Web

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

<http://www.cisco.com>

Translated documentation is available at this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

## Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

## Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:  
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the “Leave Feedback” section at the bottom of the page.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

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

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

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

### Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

<http://www.cisco.com>

### Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

## Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

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

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

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

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

## Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

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

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

# Obtaining Additional Publications and Information

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

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

[http://www.cisco.com/en/US/products/products\\_catalog\\_links\\_launch.html](http://www.cisco.com/en/US/products/products_catalog_links_launch.html)

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary*, *Internetworking Technology Handbook*, *Internetworking Troubleshooting Guide*, and the *Internetworking Design Guide*. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

<http://www.ciscopress.com>

- *Packet* magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access *Packet* magazine at this URL:  
<http://www.cisco.com/go/packet>
- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:  
<http://www.cisco.com/go/iqmagazine>
- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private Internets and Intranets. You can access the Internet Protocol Journal at this URL:  
[http://www.cisco.com/en/US/about/ac123/ac147/about\\_cisco\\_the\\_internet\\_protocol\\_journal.html](http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html)
- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:  
[http://www.cisco.com/en/US/learning/le31/learning\\_recommended\\_training\\_list.html](http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html)

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This document is to be used in conjunction with the documents listed in the “[Related Documentation](#)” section.

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